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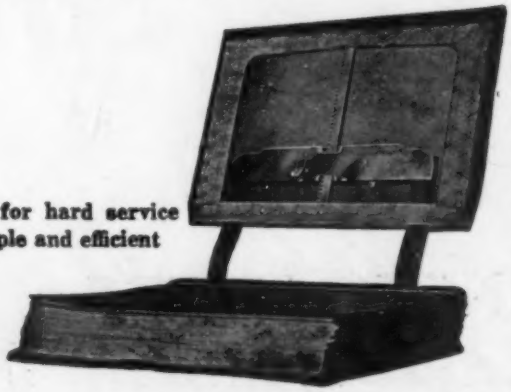

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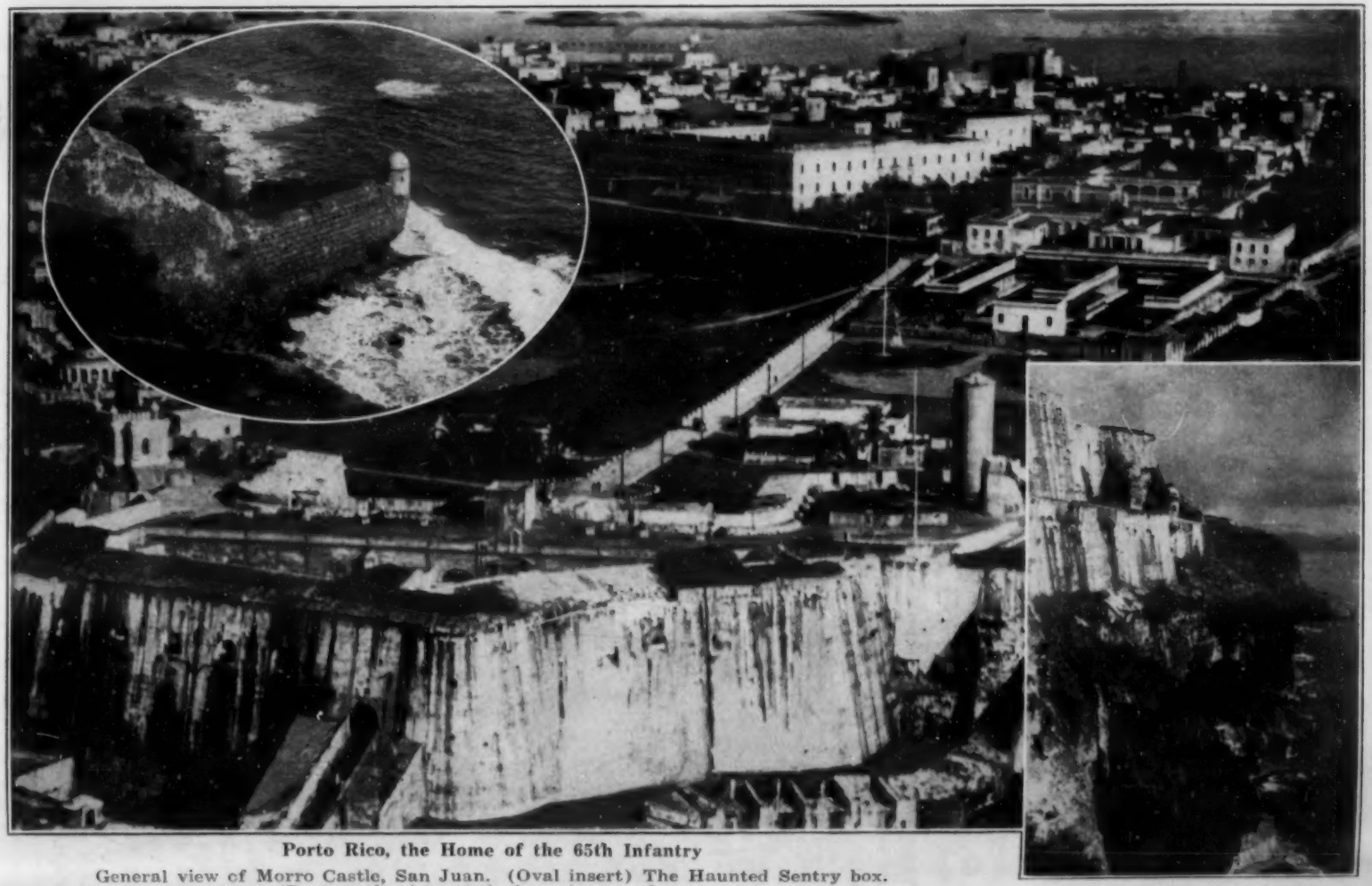


Porto Rico, the Home of the 65th Infantry

General view of Morro Castle, San Juan. (Oval insert) The Haunted Sentry box. (Rectangular insert) A sheer drop to the sea

INFANTRY JOURNAL

Vol. XXXV September, 1929 No. 3

The Future of Infantry

I.

THE INFANTRY DEVELOPMENT PROJECTS

CAPT. CHARLES L. BOLTÉ, Infantry

In an effort to acquaint the Infantry with the infantry development projects that are now under way, Captain Bolté has prepared and the INFANTRY JOURNAL *is publishing a series of articles under the title "The Future of Infantry." Captain Bolté has devoted the present article, which is the first of the series, to introducing the subject and giving a general idea of the infantry development project as a whole. Subsequent articles will tell about the separate projects, what they are, how they are being handled, and what they are accomplishing. The whole series should go far toward acquainting Infantrymen with the Infantry's contribution to the general progress of the Army.*—EDITOR.

IF you were given a free hand to reconstitute the infantry arm, subject only to the present status of invention and technical development, would you, and how would you, alter the present organization, equipment, training, and tactical employment of our Infantry?

Would you completely motorize all infantry regiments? If so, how would you contemplate the employment of those regiments in a theater where poor roads permitted free use of animal transportation only? Would you increase the proportion of machine guns to riflemen in the battalion? If so, how would you provide for the smooth supply of the increased amount of ammunition demanded? Would you arm every rifleman with a reduced caliber autoloading rifle such as that which is now being tested? Would you then make a corresponding reduction in the caliber of the machine gun? Would you make armored fighting vehicles, such as light tanks and tankettes, an integral part of the infantry battalion, regiment, or brigade? If so, how would you arrange for coordination of the greatly increased battle-speed of those vehicles with the slower rate of movement of men fighting on foot? In view of the usual shortness of available training time and the increasing complexity of modern war, would you abandon any attempt to teach in the lower units the principles or abstract reasons that underlie the conduct of combat, and substitute dogmatic training in a very limited number of stereotyped methods, trusting that those would fit well enough to give satisfactory results any of the infinite number of situations which arise in action? If so, how would you justify your failure to capitalize the inherent initiative and native independence of the American, and how would you excuse a reverse in combat that might result from the unsuitability of one of those

fixed methods to the requirements of an unforeseen situation?

Are we to continue the paradox which places on the person of the infantryman a fifty or sixty pound load of equipment, and then expect him to advance a thousand yards or so on foot, by rushes "at top speed," and to "throw himself upon the ground" when we know from repeated experience that "top speed" and "throwing oneself upon the ground" are, under such circumstances, but empty phrases, and that the bulk of the equipment so carried will never be used and could better be carried by the transportation in rear? Are we to adhere to a squad of eight men, in which the leader deals directly with more individuals than does any leader above him in the military hierarchy and with a diversity of weapons which might well dismay him, merely because that squad organization fits in with our obsolete close order drill movements? Are we to retain the present excessive number of command echelons when experience has taught us that the necessary traversing of those numerous links in the command chain causes delays not to be permitted by the increasing rapidity of flow in the conduct of modern combat? Shall we maintain the present unsystematic organization of the divisional infantry wherein the number of major subdivisions under immediate control of the next higher leader varies from seven in the squad through three in the section, two in the platoon, three in the company, four or five in the battalion, three in the regiment, two in the brigade to two in the division? Or shall we seek a standard system that conforms to the basic principles that govern employment in combat, which will thus be equally applicable to all infantry units and hence independent of the wide fluctuations in numerical strength which those units inevitably experience in action? Shall we continue in musketry training an almost mathematically precise method of fire distribution in which an endeavor is made to turn the rifleman into an automaton? Or shall we, in view of the emptiness of the modern battlefield and of the growing increase in individual fire-power, turn to a method which will more truly develop the individual into a thinking entity?

These problems, and many others of similar nature and import, are examples of the questions which the Infantry Board and the agencies that act in cooperation with that body are striving daily to solve. Arising out of these problems, and including them all, are the various projects for the present and future development of the infantry arm of our national defense weapon which are being studied at Fort Benning on the basis of the lessons taught by the World War, the changes that have taken place in the nature, equipment, and methods of modern warfare, and the logical predictions which military thinkers are justified in making.

Constant attention to the problem of keeping our Infantry up-to-date is demanded by the progress that is being made in the invention and development of new and more effective weapons and defensive measures in our own and other countries. That progress is continual, and the best we can hope to do in securing the national defense is to preserve the balance of military power, to hold our own or to forge a little ahead in the modernization of war and of the engines of war. For example, we have long been satisfied that our Springfield rifle surpasses in quality

the individual arm of any other nation. But such superiority cannot last forever, and it seems that the time has come to take another step forward. It is like the race between the projectile and the armor plate; each gains a temporary advantage, only to yield it for a time when the other increases in efficiency. We can never afford to stop definitely all attempt to progress, for we would then fall so far behind that disaster might overtake us before we could catch up. We can at best but pause when we have gained that slight superiority which is the decisive factor in determining the outcome of a war, only to take up the advance again when that superiority is threatened. And he who deplores the tendency to change evidenced in the experiments being conducted and in the amendments to our tables of organization and to our training regulations, is blind to the fact that without that tendency to change we should inevitably fall hopelessly behind.

The tendency to progress is limited first of all by the current status of scientific invention and discovery. It would be a satisfying but idle dream to imagine the immediate equipment of our infantryman with an invincible weapon that would fire accurately two or three hundred rounds a minute, with a protective armor which would render the enemy's missiles harmless and yet would not hamper movement, with a vehicle responsive to his every wish which would carry him over any terrain without his becoming fatigued. Immediate equipment is an empty phrase when applied to a force of hundreds of thousands of men. It requires months and years to perfect and produce in usable quantities new items of material. The saving fact is that any opponent is no less subjected to the same limitations than are we ourselves.

There are, moreover, practical limitations to the development, production, and distribution of new weapons, imposed by the cost in money, men, and time. While it is true that when war occurs money becomes a minor consideration in a wealthy country such as ours, nevertheless the peacetime policies of administrative economy and sound governmental procedure exercise a major influence upon our efforts to modernize our armed forces, and we are therefore constrained to limit ourselves to theoretical calculations and to small-scale laboratory experiments.

The problem of maintaining the quality of our Infantry is of a dual nature. We are obliged to strive for the maximum efficiency possible with our present strength, organization, and equipment, making only the changes that can be made within the limits of our peacetime resources and that have been proven wise after careful laboratory experiment. Yet we must at the same time keep constantly before us the probabilities of the future, and, in the light of what we can logically foresee and predict by virtue of our past experience, prepare for the greatly increased rate of army modernization which must inevitably take place upon the outbreak of war. It is with the second half of this vital problem that the Infantry Board is primarily concerned, and it is in the search for the solution of it that there are being conducted at Fort Benning, and elsewhere throughout the service, tests and experiments with new types of weapons, new systems of organization which will conform to the powers and limitations of those weapons, and new methods of training whereby those new organiza-

tions can learn to use effectively those new weapons in the limited time that may be available after the projected changes are accomplished.

There is a considerable but not entirely unavoidable lag in the acceptance of change by the service, behind the apparent desirability of that change. This is caused partly by the practical limitations to the perfection and production of new material. It is not physically possible to invent, perfect, and produce immediately and in usable quantities a new weapon, such as a self-loading rifle or a light tank, which will meet successfully the severe tests which we can foresee that combat will impose. And in view of the cost in time and money it would be unnecessarily wasteful to proceed with quantity production when further changes and developments appear to be imminent.

This lag is further caused partly by the time consumed in the formulation and enunciation of the doctrines and regulations for the employment of the new weapon after its adoption has been determined upon and its production commenced. Insofar as it is possible for the production and the pronouncement of the method of use to be accomplished concurrently, these causes of the lag can be reduced and minimized, but they are still to a degree unavoidable.

There is, however, a still further cause of the lag in the acceptance of change which is directly chargeable to the inherent conservatism of our military thought. It is toward the removal of this cause that we should bend our efforts. Public opinion has always, and, it must be confessed, with no little justification, accused the military of undue resistance to the demands of scientific progress and of modernization. Insofar as this accusation is based upon a loathness on the part of the soldier to abandon obsolescent means of combat and a desire to adhere blindly or slothfully to weapons and to methods of fighting which have proven themselves in past wars but which will apparently be totally unsuited to the conditions of future wars, that accusation is justified. History is replete with examples of reverses, or of successes gained at unnecessary cost, because one or both of the belligerents had not had the prior willingness or foresight to adopt the changes pointed by the accomplished or clearly pending developments in scientific discovery and in military thought. A case in point is the employment of black powder as a propellant by our forces in Cuba. Further illustrations might be made with regard to our adherence to the "skirmish line complex" (which is still with us) which characterized our early engagements in the last war, and to the reluctance with which the Germans gave up the massed formations which in the face of heavy fire cost them so heavily in 1915 and 1916.

To overcome the lag in practical progress behind experimental development insofar as that lag is due to excessive conservatism throughout the service, two methods suggest themselves both of them offspring of the apparent necessity for stressing foresight and logical conjecture as to the changing character of future warfare.

The first of these methods has to do with keeping the service in general informed as to the tendency of impending changes and as to the actual accomplishments in test and experimentation. It is seldom possible for this to

be done through the medium of such official publications as tables of organization and training regulations, for these deal rather with proven methods and articles of equipment after they have been successfully tested and definitely decided upon. It is here that the service journals and the several service schools can and do play an important part. They may, as it were, properly deal in futures, always pointing out that conjecture as to the future must be logically justified by sensible analysis of past experience.

And it is here that the second of the two methods suggested comes into play, that of critical study of military history. As pointed out by Colonel Bundel in the INFANTRY JOURNAL of March, 1929, a study of military history which results only in the accumulation of a mass of undigested facts, without any effort to deduce from those facts guides to serve in future situations, is not only of little military value but may even be a serious hindrance to progress. For example, except by actual employment in combat, it is possible to predict the effect of such a new departure as the self-loading rifle only by a critical consideration of the changes wrought by the previous introduction of such weapons as the fire-lock, the needle-gun, and the breech-loader. Such consideration makes use of sound deductions regarding the steadily decreasing density of individuals per unit of combat area, the increasing facility with which the firer keeps himself concealed, the growing need for more plentiful ammunition supply. The task becomes one, then, of solving an equation in which the effect of past developments, such as new weapons, and the current development, such as a newer weapon, are the known terms, and the probable effect of the newer weapon is the unknown term. It is at once apparent that since the effect of past developments is readily deducible from the facts of history, the degree with which those whose duty or desire it is to solve the given equation can perform that duty will depend directly upon the promptness and extent to which they become cognizant of the current development. It follows that, qualified by the limits of military permissibility and the caution that experiment and test are at best unfinished phases and hence largely matters of conjecture and forecast, it is highly desirable that the service at large be supplied with timely information as to the progress being made and the changes contemplated.

What are some of the major changes that are taking place and that are being foreseen in the modernization of war, of armies, and consequently of the Infantry? Outstanding among these changes are the tremendous development in aviation, the steady progress in mechanization and the use of motor transportation, the increase in actual and potential firepower per individual and per unit of combat area, and the perfection of chemical warfare methods of attack and defense. All of these changes are making more imperative a steady increase in the tactical dispersion of personnel, a decrease in the density of men in the combat area. They are resulting inevitably in greater difficulties of control and command, which are being alleviated only in a measure by the development of more efficient means of inter-communication, such as the radio-telegraph and the radio-telephone. The airplanes and the fast-moving tank have introduced problems in battle-speed of growing

complexity, circumscribed only by the physical limitations of the human body, brain, and nervous system. No matter how far away we may push the horizon of conceivable mechanical development, there are fixed limits to the rate at which a man on foot may move, to the rate at which a man may talk, to the speed of muscular or nervous reaction to exterior stimulus. We may by training and habituation develop these capabilities beyond those that man has heretofore possessed, but we cannot conceivably pass the fixed maximum which we can even now closely measure or approximate. These physical limitations to man's capabilities afford us a definite basis, a known term, in the problems which we are striving to solve. On the other hand, air speeds of three hundred miles per hour, cross-country ground speeds of forty miles per hour, rates of automatic fire of two thousand rounds per minute, night aerial photography of large areas from several miles altitude, television and radio-talkies, are all accomplished facts, unpredicted a few decades ago and yet now exercising great influence upon our conceptions of future warfare.

What is inducing these marked changes in warfare? What is it that is spurring us on to greater efficiency in our methods of combat, greater effectiveness in the weapons we employ? In the first place, war itself, wherever and whenever it occurs, acts as a tremendous stimulus to the development of the means and methods by which it is waged. For example, the same great strides made in the science of aviation during the World War would probably have been spread over a peacetime period several times as long. The wartime invention and perfection of chemical and mechanized methods of attack made vitally urgent the devising of counter-defensive means by those faced otherwise with defeat and disaster. Secondly, commercial development brooks no opposition, and the flow of military thought and ingenuity must perforce keep pace. Public opinion, through its legislative representatives or through the press, is quick to condemn the military laggard who insists on standing by obsolescent forms and means of combat. The progress being made in armies other than our own serves at once as a guide and a spur to our own progressive efforts, and we watch their failures and accomplishments and they ours, with an interest far from casual.

In the Infantry, exclusive of other agencies contained within the War Department and the kindred branches of our service, there are three general groups of thinkers and experimenters engaged upon the problems that come into being as a result of the changes in the science and art of waging war. Existing for the single purpose of solution of these problems, are the Infantry Board and the Department of Experiment, together with the testing troops at Fort Benning acting in accordance with their plans and projects. The Academic Department of the Infantry School includes within its province of instruction a constant effort to assist in the conception and theoretical application of solutions to the many questions that arise in the development of new means and methods of combat. And finally the Infantry in general is urged, required, and expected to devote a part of its thought and action toward the projects for the development of the Infantry.

What are, then, these infantry de-

velopment projects? They fall generally into the four classifications of *organization, equipment, training,* and *tactics.* The first of these has to do with the number of infantry units and subdivisions of those units; the strength, nature, composition, and armament of each; and the scheme for control, command, and administration of the organization so constructed. The second deals with the type, characteristics, and capabilities of all the many items of equipment and armament with which the infantryman and the unit to which he belongs are provided, including motor transportation, mechanized fighting vehicles, weapons of all kinds, and such other articles as clothing, chemical defenses, subsistence and supply items. The third classification, training, includes the instant problem of providing for and perfecting the training schemes and methods for our Infantry of today with the equipment now on hand, and the further problem of foreseeing and arranging training systems for our Infantry of the near or distant future with the equipment which that Infantry will in all probability possess. Finally, the employment in battle of the Infantry, organized, equipped, and trained as contemplated or provided for in accordance with these three general classifications, must be based upon them and in turn serve as a basis for them. We thus have a fourth general project, the development of infantry tactics.

There can, of course, be no clearly defined line of demarcation between these general projects. Each blends into and is dependent upon the others, and no single proposition can be considered or decided upon its merits alone. For example, the proposal to develop and perfect a self-loading rifle immediately gave rise to questions as to whether every infantryman should be armed with the new weapon, whether the caliber should be reduced in order to compensate for the increased weight in mechanism and the increased ammunition consumption, whether the size of the squad so armed must be altered to permit the most efficient control. Questions arose as to how the combat training should be modified to meet the powers and limitations of the new weapon, as to what the effect will be on the tactical employment of a unit armed therewith. And there were many other questions of a similar nature and import, any one of which might present a sound argument for or against the original proposal. The task of seeking out the most satisfactory compromise between the many factors that pull in diverse directions is a serious one, the accomplishment of which is being constantly urged by the imperative demand for progress. It cannot be accomplished through an arbitrary decision made without a careful weighing of all the facts involved, and this latter process demands the expenditure of much time, thought, and effort. And yet we must at the same time strive to maintain the status of the development projects so that at any stage they may be speeded up or brought rapidly to the most effective conclusion possible in the light of such an uncontrollable contingency as a national emergency.

It is apparent, then, that profound and far-reaching changes are steadily and inexorably taking place in the rôle and capabilities of infantry in modern warfare, dictated and influenced by the progress in scientific invention,

commercial development, and military thought and practice.

It is imperative that our Infantry conform to and take advantage of these changes if it is to keep abreast of the times. The manner of conformance cannot be determined off-hand, but presents a problem that demands the constant application of our best thought and effort. In view of the sound limitations of economy and of the fact that each step in our progressive development blends imperceptibly into those that are to follow, the only logical course open to us is one that begins with theoretical consideration of the problem, and passes thence through the stages of laboratory experiment and demonstration on a small scale to service test by units in the field, before final approval and adoption by the Infantry as a whole. This is the course actually followed in the evolution of the infantry development projects. The Infantry Board, with the cooperation of the Academic Department of the Infantry School and other agencies, considers first the problem from a theoretical standpoint. In conjunction with the Department of Experiment and the testing troops, it then conducts a series of laboratory experiments based upon the theoretical findings, upon the successful conclusion of which there are conducted service tests by one or more regiments in the field. Then, and only then, can the equipment, doctrines, or systems so tested and decided upon be wisely approved by the War Department for adoption by the Infantry and embodiment in the regulations.

Subsequent articles will deal in turn with the infantry development projects in organization, equipment, training and tactics.

The "Fightingest" Regiment—The 4th Infantry

From the Notebook of "General Experience"

THE 4th Infantry has no fewer than forty-four battles and campaigns to its credit. It has actually participated in many more than forty-four engagements, as some of the campaigns involved more than one fight. For example, the Seminole Indian campaign included several battles which were of sufficient importance to deserve separate credit, such as Wahoo Swamp, Willachoochee, and Lake Ocheechobee.

Antiaircraft Rifle Fire

CAPT. SIDNEY H. NEGROTTO, 12th Infantry

Captain Negrotto's article describes the results that he obtained in carrying out the provisions of tentative Training Regulations 300-5. So important is the subject of rifle fire against aircraft and so decisive are the results that Captain Negrotto obtained, that a record of what he did should be of exceedingly great interest throughout the Infantry. The INFANTRY JOURNAL *is anxious to receive articles on antiaircraft rifle fire from all regiments and publish them. In this manner it will be possible for the entire Infantry to benefit by the experiences of each regiment and so to stimulate the most rapid development of this important subject*—EDITOR.

NUMEROUS tests have been made from time to time to determine the effect of machine gun fire on low-flying aircraft, with the results that at least a tentative measure of proficiency has been established. But what are the possibilities of rifle fire against similar targets?

An answer to this question was sought in a test conducted with a rifle section (twenty-one riflemen and three automatic riflemen) of the 3d Battalion, 12th Infantry. The section was given one week's training in antiaircraft marksmanship to include preparatory exercises and firing at moving targets with the sub-caliber rifle. At the conclusion of the sub-caliber firing, two days were spent in firing at towed targets with .30 caliber ammunition.

The men who made up the section had just completed the regular target practice and were expert riflemen, sharpshooters, and marksmen. About one-third of the men had less than one year service. The automatic riflemen were qualified with but had not received any instruction in this weapon for over a year, and had not fired it during that time.

Tentative Training Regulations 300-5 were used as a basis for the antiaircraft instruction. These regulations were departed from in a number of particulars after it was found that the methods prescribed were inadequate or lacking in simplicity.

In conducting the preliminary training and the firing at towed targets, the following objectives were kept in view:

1. To give a fair and comprehensive test to methods prescribed in T. R. 300-5.

2. To determine the simplest and most comprehensive methods of training, and the extent and kind of firing necessary to establish a measure of proficiency.

3. To determine as far as practicable the number of hits per one hundred rounds to be expected on airplane targets at various ranges, and,

4. To determine the probable limits at which it will be unsafe for an airplane to approach well-trained infantry (riflemen).

FIRING AT TOWED TARGETS

The firing at sleeve targets was done at Fort George G. Meade, Md., on June 17-18, 1929. A plane specially equipped to tow sleeve targets was secured from Aberdeen Proving Grounds.

The plane was given a mission consisting of fourteen tasks, as follows:

THE TASKS

Task No.	No. of flights	Kind of ammunition	Estimated speed of plane in m. p. h.	Horizontal range to target in yards	Altitude of target in feet	Sight Setting
1	4[1]	Tracer[2]	75-100	100-200[3]	300-600	Battle sight
2	4	"	"	200-300	300-900	"
3	4	"	"	300-400	600-1200	"
4	4	"	"	400-500	900-1200	"
5	4	"	"	500-600	1200-1500	1000[4]
6	4	"	"	1000-1200	1800-2400	"
7	4	"	"	1500	3000	"
1A	4	Ball	"	100-200	300-600	Battle sight
2A	4	"	"	200-300	300-900	"
3A	4	"	"	300-400	600-1200	"
4A	4	"	"	400-500	900-1200	"
5A	4	"	"	500-600	1200-1500	1000[4]
6A	4	"	"	1000-1200	1800-2400	"
7A	4	"	"	1500	3000	"

[1] After each task the plane dropped the target and let out another for the next task.
[2] Grade I, red, 1926. The tracer ammunition was to permit adjusting the fire (increasing or decreasing the lead). This furnished data for the tasks to be fired with ball (solid) ammunition. In Task No. 1, for example, the range, which was to have been about 100 yards, was 240 yards; this required more lead, the amount of which was recorded for use in Task No. 1A.
[3] The firing line, on the side of a low hill, was irregular, with about five paces between skirmishers. No rifle slings or rests were used. Some men fired from the standing and others from the modified kneeling position.
[4] Open sight.

The following tables give the results of the firing by tasks together with other data recorded during the tests:

THE RESULTS

Task No.	Range required by task yards	Width of target in mils	Actual range to target yards	No. of rounds fired	No. of hits	Hits per 100 rounds	Initial aiming point used	Adjusted aiming point used
1	100	35	280	240	43	18	Target	½ TL[1]
2	200	25	400	317	18	5.6	2 TLs	3 TLs
3	300	22	450	377	11	2.9	3 TLs	5 TLs
4	400	16	620	430	9	2	4 TLs	6 TLs
5	500	15	660	425	14	3.2	6 TLs	7 TLs
6	1000	8	1250	391	4	1	7 TLs	9 TLs
7	1500	5	2000	380	0	0	9 TLs	10 TLs
1A	100	40	250	227	75	33	½ TL[1]	None
2A	200	32	310	362	54	14	3 TLs	None
3A	300	27	370	460	38	8.2	5 TLs	None
4A	400	23	430	428	22	5.1	6 TLs	None
5A	500	16	620	428	14	3.2	7 TLs	None
6A	1000	7	1300	192	0	0	9 TLs	None
7A	1500—Not fired.							

[1] Target length.

DISCUSSION

The only meassure of fire efficiency is the number of hits per hundred rounds in a given unit of time. In the case of a rapidly moving plane the unit of time is very short—fifteen to thirty seconds—and the number of hits required to disable the plane depends upon the part of the plane that is struck—one hit in a vital part would

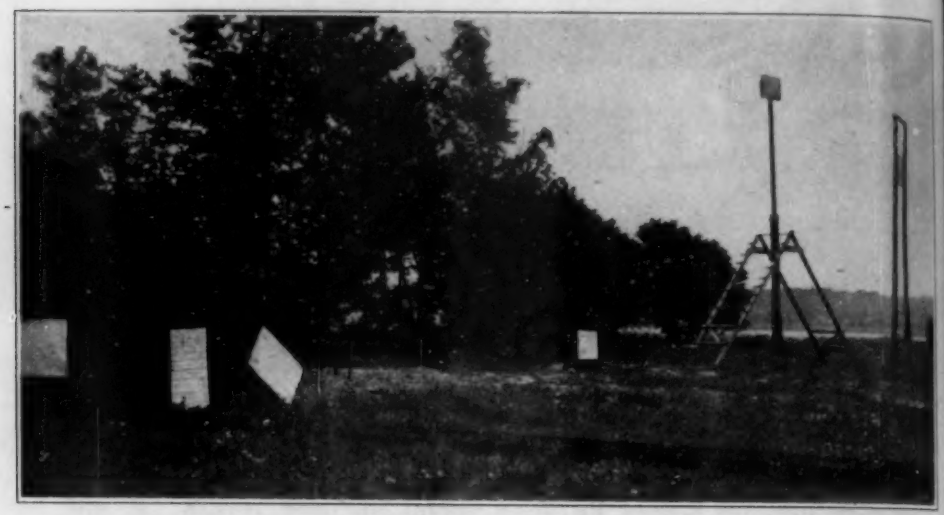
The Horizontal Moving Target and the Method of Giving Speed to the Carriage

bring down a plane. The greater the number of hits, the greater the probability of a vital hit. Rifle fire will have little or no moral effect on the pilot unless there are hits. Therefore accuracy and rapidity of fire are exceedingly important.

At the close ranges (Tasks Nos. 1, 2, 1A and 2A) the percentage of hits in the test exceeded all expectations. The accuracy fell off very rapidly as the range increased. But this was to be expected, as the point of aim becomes less definite and the position of the firer more unsteady. Yet, at twelve hundred and fifty yards, four hits were made with three hundred ninety-one rounds, or a percentage of one and two hundredths. As the number of rifles (fire power) increases, the certainty of bringing down a plane at this range obviously increases. Five hundred rifles, each firing five shots, should register twenty-five hits at twelve hundred yards. This number of hits would very probably disable the plane.

It will be noted that the number of hits per hundred rounds with ball ammunition was twice that with tracer. This brings up the question of the relative value of the two kinds of ammunition. But the value of tracer ammunition must not be minimized on account of these results. It was the tracer that made it possible to correct improper leads given in the initial fire orders. In making these corrections, the fire effect (hits per hundred rounds) necessarily suffered. But with a more correct lead known, as when ball ammunition was used, the number of hits increased materially. Without the use of tracer ammunition, the fire with the ball ammunition might have been wasted; for not only is it difficult to estimate ranges to and speed of planes, but it is exceedingly hard for men, unless very highly trained, to center their fire at the correct point of the announced lead, even when the correct lead is given. This phase of training is perhaps the most difficult.

In training the men to take the proper lead as announced, a special device was made in which a rifle was secured in a revolving mount. A scale records the number of mils through which the rifle revolves horizontally. A fifteen-foot target was placed five hundred yards from the rifle. A man was placed at the rifle, which was laid at one edge of the target. He was told to take a lead of so many target lengths and to snap the trigger when he was



The 1,000-inch Sub-caliber Range, Showing the Moving and the Stationary Targets

on the required point. When the trigger was snapped the lead actually taken was recorded. The inaccuracy of the men's judgment was surprising, but it improved rapidly with this form of training.

The device that made this work possible was called an "AA Aim Recording Table." It is very simple in construction. A company mechanic built it in two hours.

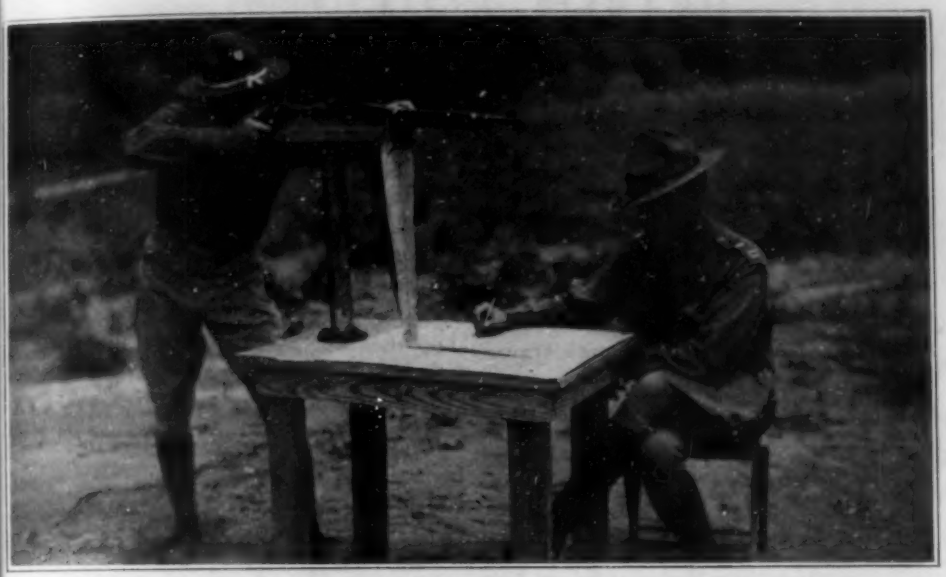
All men were given exercises with the recording table immediately after the sub-caliber range firing and before any firing at towed targets with caliber .30 ammunition. This form of training is highly recommended. Better results would be obtained by placing a regulation sleeve target at the top of a pole or flag staff instead of on the ground.

RIFLE VERSUS MACHINE GUN FIRE

It is interesting to compare the results of this test with the results of machine gun firing at towed targets done at Fort Benning in 1926. The comparison is as follows:

Average per cent of hits for 70 flights up to 1250 feet. (Machine Gun)	3.03
Average per cent of hits for 16 flights up to 1290 feet. (Rifle section)	15.09
Average per cent of hits for 28 flights up to 1300 feet. (Rifle section)	11.94
Average per cent of hits for 48 flights up to 3750 feet. (Rifle section)	8.7
Greatest per cent of hits at closest range (Machine gun)	18.6
Greatest per cent of hits at closest range (Rifle section)	33.0
Greatest per cent of hits at longest range (1250 feet) (Machine gun)	.44
Greatest per cent of hits at longest range (3750 feet) (Rifle section)	1.02

The superiority of the rifle fire over that of the machine gun in these two instances is very striking—almost unbelievable. Yet this is easy to understand when one looks at it in the light of the law of probability of accidental errors. The center of impact of the shot group of each rifleman is subject to a constant error, due to the peculiarities of aim and other causes. These shot groups are grouped around the true center of the target in accordance with the same law. As the number of



The Antiaircraft Aim-recording Table in Operation
The officer records the actual lead taken by the man at the gun. The man is required to simulate firing six shots in thirty seconds at an announced lead of so many target lengths. After this, the man is shown where his shot groups would have struck and the number of leads he was in error

riflemen increases, these constant errors tend to annul one another, and ultimately make the most probable center of impact coincide with the true center of the target. The machine gun is subject to same source of errors, and has about the same fire power as a rifle section. But with a single machine gun there is only one constant error. Therefore the accuracy of the machine gun is reduced by the amount of this error. This error, as with riflemen, is compensated for as the number of guns is increased. But the number of machine guns that will be brought to bear on a single plane will be necessarily limited.

This comparison, however, does not take into account the indefinite factor of morale under service conditions. Also, the amount of firing that has been done is not sufficient for drawing accurate conclusions. It seems, however, that in this kind of firing the fire effect of a rifle section is equal to or greater than that of a single machine gun, and that with well-trained troops on the march and in bivouac, the fire of the rifle section can be applied against a plane with the same facility as that of the machine gun. In combat, protection against aircraft will devolve upon the support and reserve units, and here again the rifle should be as easy to use as the machine gun.

TRACER AMMUNITION

The kind of ammunition to be used is of vital importance. We can use all tracer or all solid ammunition, or a mixture of the two. With solid ammunition it is of course impossible to adjust the fire, and unless the point of aim is the target itself, or within a radius of two target lengths of it, very few hits can be expected. Better results are possible with a mixture of

solid and tracer, and all tracer will produce the best effect.

A word of warning, though, about tracer ammunition. In firing it against aerial targets there is a curious optical delusion which gives the impression that the target is being struck when the bullets are really passing at least one target length in rear of it. It is necessary to take this illusion into account when adjusting fire with tracer. For example, fire is opened with a certain announced lead. If the tracer appears to be striking the target, all men automatically increase their lead one target length; if it appears to be striking one lead in rear of target, men increase their aim two leads, and so on. However, considerably more firing must be done before this can be laid down as a positive rule.

CONCLUSIONS

The following, in part, are the conclusions drawn from the tests:

a. That the methods of training laid down in T. R. 300-5 are sound in principle.

b. That at ranges under five hundred yards, a plane has little or no chance of escape from well-trained riflemen, and at ranges as great as twelve hundred yards the possibility of accomplishing a tactical mission against ground troops is very small.

c. That a good grade of tracer ammunition is essential in order to adjust the cone of fire rapidly.

d. That good results with solid ammunition are possible with highly-trained troops.

Origin of the Service Stripe

From the Notebook of "General Experience"

IN August, 1782, General Washington issued regulations prescribing insignia to denote length of service. Each man who had served with "bravery, fidelity, and good conduct" for three years was to wear a stripe on the left sleeve.

On completion of six years' service, two stripes were to be worn.

The Perfect Warrior

MAJ. THOMAS S. ARMS, Infantry

TURNING back the pages of history seven hundred years, we find that the greatest empire of that day was ruled by an Oriental. Genghis Khan, an illiterate, from an obscure nomad nation, formed a consolidation of Asiatic tribes. He conquered and ruled over a larger extent of territory than any other man before or since. Here was a ruler who rose from the nomads of the Gobi, made himself master of half the known world, and established the Mongolian dynasty that ruled in the Orient for centuries. From utter obscurity he led the Mongols to victories in all his campaigns and astounded the world by his successes. He was not only supreme as a military leader, he was author of a code of laws that successfully governed fifty nations. Most of the great leaders of the world suffered defeat and lived to see their empires crumble, but not so this Mongol. "In 1227 Genghis Khan died in the midst of a career of triumph. His empire reached already from the Pacific to the Dnieper. And it was an empire still vigorously expanding."[1]

The Mongols were a tribe of nomads. They originated in that cold, barren country between the Great Wall of China and Lake Baikal. Most of this area is covered by the Gobi Desert. Their main occupation was breeding horses and cattle, and raiding the herds of their more prosperous neighbors.

In the year 1162 there was born on the banks of the river Onon in the northern Mongolia a boy, Temujin, later to be known as Genghis Khan. The boy's father, Yesukai, was the leader or khan of his tribe and the ruler of forty thousand *yurts*, or native tents. While a successful leader among his own kind, he never attempted to leave the Gobi.

The life of children among these nomads on this desert in the twelfth century was such that it seems as though only the super-child could survive. After the transition from mother's milk to mare's milk the children had to look out for themselves. The food for the tribe was cooked in a large kettle over a fire of dried horse dung, wood on the Gobi being too scarce to use for fuel. The precedence of eating was, men first, the aged and women second, and then the bones and scraps for the children, after whom came the dogs. The end of winter found the tribes in dire straits. At this time they were usually reduced to dried fermented milk and boiled millet seed.

As Temujin grew older he took up the usual duties of the boys of these nomads. They did the fishing for the tribe. They also had charge of the herds of horses, which often necessitated a search for lost animals, which kept them away from their yurts and on horseback for days at a time. Food on these expeditions was a non-essential. Sometimes they ate and often they did not. On their return they would gorge themselves, if they had

[1] H. G. Wells "The Outline of History, Being a Plain History of Life and Mankind." Fourth Edition.

the opportunity, to make up for their days of want and to prepare for the future.

The favorite sports for youths of that day were horse racing, wrestling and archery. The races were usually about forty miles in length. The wrestling was, of course, rough. Temujin excelled in feats of strength and in wrestling.

When Temujin was thirteen years old his father died. The tribes that had given their allegiance to Yesukai evidently doubted the advisability of entrusting their welfare to so young a leader. His mother remonstrated with them and was finally successful in persuading nearly one-half of his father's retainers to return to the banner of her son. The twenty-five years following the death of his father were ones of continual strife and warfare for Temujin. He and his followers were never disastrously defeated and seldom checked. Thus, through twenty-five years of continual practice, he received the foundation of his knowledge of the art of war. Temujin's first major campaign was against the Karaits, a neighboring nation.

Wang Kahn was the ruler of the Karaits, a semi-nomad tribe. His domain was in what is the northern part of present day China, northwest of the Great Wall.

Yesukai, Temujin's father, had formed an alliance with Wang Khan. After the death of his father, Temujin renewed the alliance, and later the allies joined forces and conducted several successful campaigns together against the Tartars. These two leaders finally disagreed about several minor matters. Wang Khan, spurred on by the false advice of several of his associates, who were jealous of Temujin's success and prestige, declared war. They met first in 1202 and after a day's terrific fighting Wang Khan's army was victorious. Most of Temujin's forces escaped and Wang Khan failed to take full advantage of his victory by neglecting to make a vigorous pursuit.

In 1203 both of these leaders again took the field. By a long night-march the forces of Temujin fell upon the Karaits at dawn while they were still in camp. They cut down the slumbering guards and completely surprised the troops of Wang Khan. The Karaits were utterly defeated and fled from the field, closely pursued by the Mongols. To those of the Karaits who surrendered he promised to remit the usual penalty of death if they would serve him and said, "Men fighting as you have done to save your lord, are heroes. Be ye among mine and serve me."[2]

Temujin used the next three years to make himself master of all the tribes outside of the Great Wall. Marco Polo said of him "When he conquered a province he did not harm the people or their property, but merely established some of his own men in the country among them, while he led the remainder to the conquest of other provinces. And when those whom he conquered became aware how well and safely he protected them against all others, and how they suffered no ill at his hands . . . then they joined him heart and soul and became his devoted followers."

Now at the age of forty-four, Temujin found himself supreme over a considerable portion of the interior of

[2] Harold Lamb, "Genghis Khan, the Emperor of All Men."

western Asia. There was no longer any open opposition to his rule within his domains. To govern successfully these many different tribes was a problem.

In 1206 Temujin summoned a council of Khans to meet near his birthplace on the river Onon. He explained to the assembled leaders that they had gathered to elect one man as ruler over all their tribes. He was, of course, elected. At the request of the council he adopted the title of Genghis Khan. The name Genghis Khan has as many different translations as it has spellings. The most suitable translation seems to be the one that the Chinese give it, "Perfect Warrior."

At this time Genghis Khan announced his code of laws, the "Yassa" which was to govern his new empire. Among his laws that are especially interesting we find the following:

"It is ordered to believe that there is only one God, creator of heaven and earth, Who alone gives life and death, riches and poverty as pleases Him—and Who has over everything an absolute power.'"[3]

"Leaders of a religion, preachers, monks, persons who are dedicated to religious practice . . . are to be freed from public charges.'"[3]

"Forbidden ever to make peace with a monarch, a prince or a people who have not submitted.'"[3]

"The moment a campaign begins each soldier must receive his armor from the hand of the officer who has them in charge. The soldier must keep them in good order, and have them inspected by his officer before a battle.'"[3]

"Forbidden under death penalty to pillage the enemy before the general commanding gives permission but after this permission is given the soldier must have the same opportunity as the officer, and must be allowed to keep what he has carried off, providing he

[3] Henry H. Howorth—"History of the Mongols."

has paid his share to the receiver for the emperor.'"[4]

This code of laws also provided for the details of civil government, dividing the empire into provinces, each with a governor.

There were also incorporated in this Yassa many important matters, organization of the army, laws corresponding to our articles of war, regulations to exercise and train the army, and hunting laws, drafting of men both for the army and for government work. These laws were the foundation of the success of Genghis Khan; they prescribed the discipline, not only for his army, but for his empire.

Even in those days, prohibition was an important problem. Drunkenness was a common failing of the Mongols. While he apparently did not incorporate it in his laws, he expressed his opinion to the council of Khans on this subject as follows: "A man who is drunk is like one struck on the head; his wisdom and skill avail him not at all. Get drunk only three times a month. It would be better not to get drunk at all, but who can abstain altogether?'"

The pronouncement of the Yassa and the other instructions of Genghis Khan were part of what might be called his inaugural address.

The next four years were ones of comparative quiet and peace for the Gobi. During this time Genghis Khan consolidated his empire. The Yassa was carried out to the letter by all the combined tribes, and all the affairs of the empire were in excellent condition.

In the fall of the year 1210 the old emperor of China died and his son, the new ruler, at once sent an officer to Karakorom, the former capital of the Karaits, where Genghis Kahn had established his headquarters, to collect tribute for the new monarch. The officer was sent back the next day with an insulting message, and a threat of war if the new emperor did not admit the supremacy of the Mongol chieftain. This, of course, was an absurd request, as the Mongols and the other tribes north of the Great Wall had been paying tribute, off and on, to the rulers of Cathay for generations. So that winter the Mongols prepared for war.

Before going into this campaign let us consider briefly the organization and training methods of these nomads. The organization of the Mongol army was not much different from that of modern armies. The organization was one of tens and multiples of ten, each division from ten men up commanded by an officer. The unit corresponding to our squad consisted of ten men, to our troop their unit was one hundred men. The next higher unit, corresponding to our battalion or squadron, had a thousand men, and the highest unit of standard organization was ten thousand men, a *tuman* as they called it, a separate command corresponding to our division. All the forces of Genghis Kahn were mounted.

The protective equipment, the armor, was made of leather. It was lacquered to make it harder and to withstand the weather. The vital parts of both men and horses were covered. The weapons, at least the heavy ones, such as lances, heavy armor, and shields, were kept in an arsenal and issued to the army when a campaign was impending. Each man's personal equipment consisted of a javelin, a curved sword, two bows

[4] Harold Lamb, "Genghis Khan, The Emperor of All Men."

and arrows. In addition, every man carried a file for his arrow heads, an awl, thread, and needles.

The usual battle formation was in five ranks. In the first two ranks both men and animals wore leather armor. These were shock troops and their principal weapons were the sword and lance. The men of the three rear ranks wore no armor, which greatly increased their mobility. Javelins, bows, and arrows were the most important weapons.

First to consider in the training was horsemanship. Brought up as they were on the steppes, with one of their principal occupations guarding their herds, the horsemanship of the nomads was unexcelled. Their horses were perfectly trained and they could guide them by voice and pressure of their heels, leaving both their arms free to manipulate their weapons. Each man could shoot his bow with nearly as good aim while galloping as he could dismounted. All were taught to turn in the seat and shoot accurately to the rear. Thus at all times during a conflict their enemies were subjected to a constant hail of arrows. The Mongols seldom closed with an enemy until they had partially disorganized him by means of this fire.

The Yassa forbade leaving behind a member of their ten who was wounded, or leaving the field of battle before the squadron standard withdrew. Pillage, before permission was given, was forbidden, and this rule kept the troops well under control until all danger of counterattack had passed. The Yassa also provided for the care of arms and equipment and their inspection before each battle.

Mongol hunts were a part of the training for war. Genghis Khan considered them a great benefit, not only from the viewpoint of exercise, but also as a means to promote bravery, maneuvering groups of men, and the tactical handling of large bodies of troops when deployed.

The Mongol tactics, though nonelastic, were very effective. They had a definite number of regular maneuvers, all executed on signals made with the black and white standards of the squadrons. These movements could always be executed with drill ground precision, even in the heat of deadly combat. Signals and prearranged maneuvers made the tactics rigid of execution, but speed more than made up for this. Signals also did away with the delays and misunderstandings that often result from messages and orders. The result was: "In rapidity of movement, in dexterity, in quickness of evolution, they surpassed all nations,"[5] Often the Mongols would retreat, apparently in complete disorder. Then, on signal, they would turn their horses about and charge in perfect order against an enemy who had broken formation to pursue. This and envelopment were their favorite maneuvers. They went into battle in their five ranks. Skirmishers were sent out from the unarmored men to harass the enemy during his advance. The squadrons (units of one thousand) were separated by wide intervals. The three rear ranks sent a cloud of arrows and javelins into the hostile forces as they approached. This fire usually disorganized the enemy somewhat. Then came the shock of Mongol armored men. All together made an excellent combination of fire and shock tactics.

[5] George T. Denison, "A History of Cavalry form the Earliest Times with Lessons for the Future."

Security, reconnaissance, and espionage were factors that contributed largely to the success of the armies of Genghis Khan. In an invasion, months before the actual movement of troops was to start, spies were sent out. These men obtained political and military information. Warriors were also despatched to capture and bring back informers. As the advance started each *tuman* sent out about two hundred scouts. These operated in pairs that scattered over the country throughout the zone of action of their unit, two days' march in advance of their troops. Flank and rear guards of similar composition were used to give all-around security and a perfect screen to all movements.

With this most remarkably conceived organization Genghis Khan prepared to move against Cathay.

(*To be concluded*)

Moral Versus Material

From the Notebook of "General Experience"

GENERAL FOCH was fond of quoting Joseph de Maistre's aphorism, "A battle lost is a battle which one believes to have lost, for battles are not lost materially."

And he would add this comment, "Battles, therefore, are lost morally, and it is morally, therefore, that they are won."

Machine Gun Antiaircraft Dispersion

MAJ. LEONARD R. BOYD, Infantry, and 1ST LT. JOSEPH I. GREENE, 24th Infantry[1]

THE use of infantry weapons against aircraft is a development of warfare which has hardly emerged from a state of chrysalis. Infantry antiaircraft fire is a subject so new and so little understood by the Army at large that many erroneous and misleading characteristics have been attributed to it. The attack upon an infantry column by scores of low-flying airplanes, and the fire action of the round troops in reply, form a picture familiar to the minds of most students of infantry tactics. The elements which make up this picture are in reality so complex that a fallacious impression of the characteristics of antiaircraft fire is apt to prevail more often than not.

Of the two divisions into which infantry antiaircraft firing falls, rifle and machine gun, the rifle fire is comparatively simple in its elucidation. Each shot at an aerial target is actually aimed and is fired in the offhand position; hence the range standards of accuracy can be accepted in arriving at the maximum of possible hits. Machine gun antiaircraft fire, on the other hand, cannot be given a standard of accuracy with the same ease. This article will deal with some of the differences in dispersion between machine gun range firing and antiaircraft firing, and the reasons for these differences, and, in addition, will present several characteristics of the cone of fire of the antiaircraft machine gun.

A large number of officers of the Infantry have seen machine guns fire at airplane towed targets They have observed trained gunners place the cone of tracer bullets so that the target appears to be centered within it for some, if not all, of the firing time. With the ground fire efficiency of the machine gun in mind, they have expected a larger number of holes in the cloth sleeve target than is usually found. Even if allowance is made for the errors of observation due to the optical illusion created by the tracer bullet against a moving target, the observers on the ground usually find that the number of hits falls so far below the expected or hoped-for number, that they desire some explanation.

In the firing of any gun which has a fixed or semifixed mount, whether a large coast defense rifle or a .30 caliber machine gun, it is necessary to know the laws of dispersion which govern its fire, if one is to understand fully the correct use of the gun and to obtain its maximum effect. The dispersion of the machine gun for all ranges, established by accurate proving ground methods, is given in the fire control tables, and is referred to in several training regulations. These data, however, are applicable to fire against ground targets only. With re-

[1] Test Officers of the Department of Experiment, The Infantry School.

gard to the antiaircraft uses of the machine gun, particularly of guns equipped with any type of antiaircraft adapter, no accurate data on dispersion are now available. Because the subject is a new one, no proving ground work has been accomplished, so far as known; and, because of the difficulties inherent in the recording of shot groups at high angles and long ranges, it may be that accurate firing data will never be achieved. Nevertheless, it is very necessary in the study of the effectiveness of machine gun antiaircraft fire, that its dispersion data be approximated in order that "possibles" may be established to which actual results may be compared.

An analysis of ground and antiaircraft fire dispersion shows that the main differences in the two are found primarily in the methods of delivering each type of fire. In ground firing the gunner, having aligned the gun on the target, strives to free the gun from the influence of his body during the burst of fire. His hand touches the grip lightly. With thumb on the grip and forefinger on the trigger, he exerts only enough pressure to insure uninterrupted fire during the burst. The recoil is transmitted directly from the gun to the tripod at the trunnion and elevating pins. When the gun is mounted for antiaircraft fire, all of the foregoing conditions are changed. First the gun is mounted on an antiaircraft adapter which is raised above and fixed to the cradle, thus placing the gun about eighteen inches higher than in the ground firing position. If the tripod is carried on the new wheeled mount this elevation is increased another twelve inches. The next difference is that the gun is secured to the adapter at one point only—the trunnion guides—to allow free movement of the gun in elevation. Free traversing is accomplished by completely loosening the jamming pivot screw. This freedom in deflection as well as in elevation is an absolute necessity in firing at rapidly moving aerial targets. The gunner, too, changes his firing position and must control the direction of fire by moving the gun during the time it is firing; and in addition, the recoil of firing must be taken up, partly by the trunnion pin which holds the gun to the adapter, and partly by the body of the firer. A tank shoulder rest, modified so that the firer can lean away from the gun, rather than toward it, has been found to be the best method of taking up part of the recoil of firing by the gunner, who places his feet well forward and leans his weight back against the shoulder rest, at the same time holding the rest firmly between his right arm and the side of his body. By means of a special antiaircraft sight, or by observation of tracer bullets, he keeps the gun so aligned that the cone of fire is centered on the moving target. Thus in antiaircraft fire dispersion is affected by the physical contact of the firer with the gun in aiming and in overcoming vibration, whereas in ground firing these two factors are controlled by purely mechanical means.

This larger human element in antiaircraft fire makes for a greater normal dispersion than that found in ground firing. In the first place, the heavy vibration of the gun during firing is not taken up as well by the body of the firer as it is by the firm two-point suspension. In addition there is, even under the most favorable conditions, a variable error of holding the gun in the proper alignment with the

target. Both errors can be reduced to a minimum by proper training, but this minimum allows at best a vibration of the gun considerably greater than in ground firing.

Now that the principal factors which cause greater vibration of the gun during antiaircraft firing than ground firing have been shown, it is interesting to compare the effect which this vibration has on the dispersion of the two kinds of fire. During a portion of the test of antiaircraft equipment, conducted by the Department of Experiment of The Infantry School, opportunity was afforded to fire a large number of dispersion groupings. The gun and mount were tested to insure normal functioning in the ground fire position, and were then used from the antiaircraft position. First, a large number of 10-round bursts were fired with the gun in the ground fire position, at a screen 1,000 inches distant. The average shot group of these bursts measured 2.55 inches in height and 2.05 inches in width, which dimensions almost exactly agree with the recognized standard shot group of 2.5 by 2.0 inches.

The same guns were then mounted on the latest type of antiaircraft adapters and 50-round bursts of tracer ammunition were fired by expert antiaircraft gunners. The average dimensions of a large number of groups fired in this manner were 13.8 inches in height and 8.0 inches in width. Screens placed 100 yards from the gun registered all the shot groups made at 1,000 inches. The average dimensions of these 100-yard groups were 48.7 inches in height and 29.3 inches in width.

Inasmuch as the guns had been found to fire normal 2.5 by 2.0 inch groups in the ground fire position, it was assumed that their cone dimensions at the lower ranges would closely approximate those given in the fire control tables. Then, in order to find the approximate height of the vertical 100 per cent antiaircraft cone at ranges greater than 100 yards, the heights given in the fire control tables were multiplied by the ratio:

$$\frac{\text{Height of antiaircraft cone at 100 yds.}}{\text{Height given in fire control table for 100 yards}}$$

or $\frac{48.7}{28.8}$. Cone widths were obtained as follows: Column 4 of Table I, Fire Control Tables, gives the approximate width of the 85 per cent cone as being directly proportional to the range. As the 85 per cent cone, by the law of chance, is in constant proportion to the 100 per cent cone, it was assumed that the width of the 100 per cent cone for the antiaircraft firing is at any range equal to the width at 100 yards multiplied by the range in hundreds of yards. (There is, however, a slight deviation from this at the shorter range.)

Table I is computed by the method just shown and gives the dimensions of the antiaircraft and ground cones.

It is believed that this gives approximately correct results for the antiaircraft, one-point suspension mount at ground level targets. It simply assumes that the greater dispersion follows the same general laws as the lesser. These results have been checked by two methods.

In the one method it was assumed that the error caused by the gun and gunner is responsible at close ranges for nearly all the dispersion, in both ground and antiaircraft firing. This is borne out by the fact that the dispersion height is very nearly directly proportional to the range at 1,000 inches,

TABLE I

Range (yds.)	Ground Cone (Fire Control Tables) Height	Width	Antiaircraft Cone (Computed) Height	Width
100	2.4′	1.9′	4.1′	2.4′
200	5.1′	2.8′	8.6′	4.8′
300	8.4′	3.9′	14.2′	7.2′
400	12.0′	4.9′	20.3′	9.6′
500	15.9′	6.0′	26.9′	12.0′
600	20.1′	7.2′	34.0′	14.4′
700	24.9′	8.4′	42.1′	16.8′
800	30.0′	9.6′	50.7′	19.2′
900	35.4′	10.8′	59.8′	21.6′
1000	41.1′	12.0′	69.5′	24.0′

(See also Figure 1)

100 yards, and 200 yards. At longer ranges the increase above the direct proportion grows steadily greater. This increase is due to ammunition variables such as slight differences in weight and shape of bullet, weight of powder charge, and speed of burning, and in the changing air conditions encountered by each successive bullet. Hence, this ammunition error can be theoretically treated as a separate factor and added to any gun error. Values for antiaircraft cone heights arrived at in this manner are as shown in Table II.

TABLE II

Range (yds.)	Cone Height (ft.)
100	4.1
200	8.5
300	13.5
400	18.8
500	24.4
600	30.3
700	35.8
800	43.6
900	50.7
1000	58.1

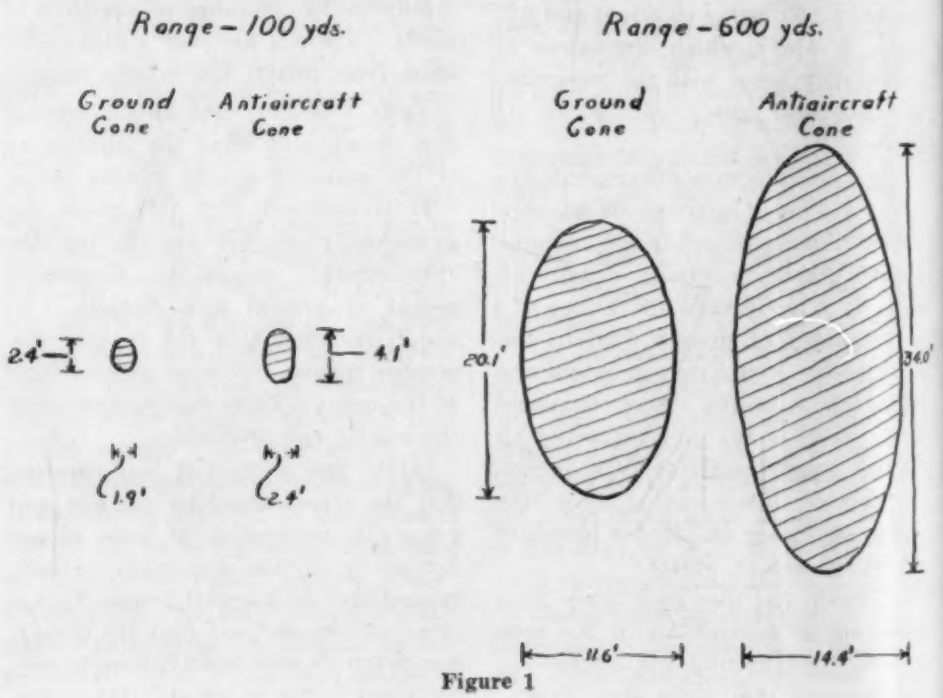


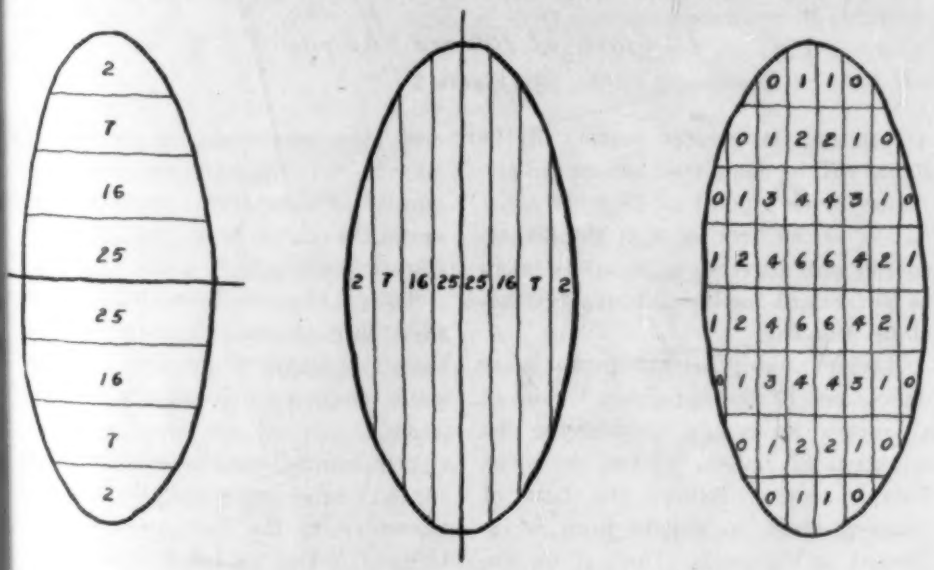
Figure 1

was assumed that their cone dimen- portional to the range at 1,000 inches,

These values are seen to coincide roughly with the cone heights given in Table I.

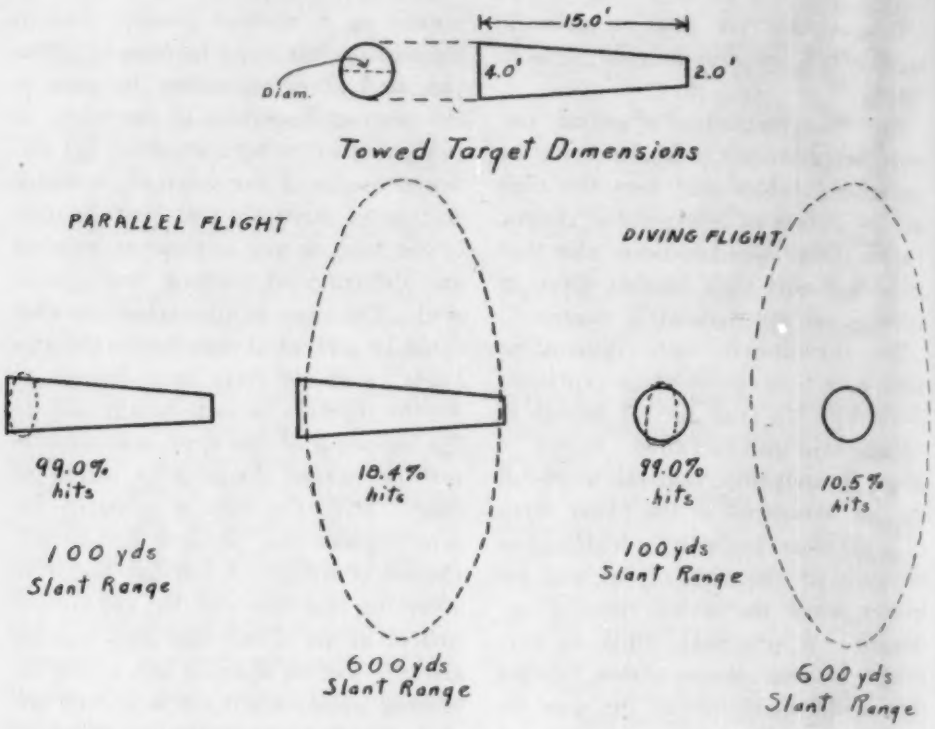
The other method of checking employs the maximum ordinates from the fire control tables and uses the high and low bullets at interpolated ranges. The results obtained indicate also that the antiaircraft cone heights given in Table II are approximately correct.

The antiaircraft cone dimensions which have been obtained, as explained previously, are true for all firings at low angles of gun elevation. It can be shown, theoretically, that the height of the cone, measured in the plane vertical to the mean trajectory, decreases as the angle of elevation of the gun increases, while the width remains unchanged. A practical study of this change in cone shape shows further that as the elevation of the gun increases, the firer has greater and greater difficulty in holding the gun steady in a vertical plane. This is bound to result in an increase of vibration and a corresponding increase in the vertical dispersion of the cone. It is impractical to set a standard for different angles of fire when the variable factors of strength and conformation of the firer, as well as those of training and difficulty of holding, are considered. The nearest approximation that could be arrived at was that as the gun angle increases from zero degrees to 90, the increase in cone height, due to the influence of the firer, compensates for the normal decrease in height of cone. Thus the cone dimensions for zero degrees can be used for all elevations of firing. A further factor in accepting this rule was that the normal combat action of machine guns against aircraft will be opening fire as the attacking planes approach at a very low elevation, and continuing this fire until they reach a point overhead. In such



Distribution By The Law Of Chance

Figure 2



COMPARISON OF TOWED TARGET TO CONE at 100 and 600 yds.

Figure 3

a situation the greater portion of the firing will be completed before the airplanes reach a point of 45 degrees elevation to the firer, so that the dispersion at zero degrees can be safely taken as a standard for normal infantry machine gun fire.

Having established the approximate dimensions of the antiaircraft cone at all ranges, let us now consider the distribution of bullets within the cone. This of course follows the Law of Chance, which in simple form is indicated in Figure 2. Then, if we fire with correct aim at a towed target moving parallel to the firer's front, at a slant range of 600 yards, which also presents its full length to the bullet cone, the percentage of possible hits may be found by superimposing a silhouette of the target, drawn to scale, upon the right hand cone shown in Figure 2.

Table III gives percentages of possible hits on targets which present their full length to the firer at various slant ranges up to and including 1,000 yards.

In a similar manner the percentages for any angle at which the target is presented to the firer may be ascertained. When the target is diving, or passing over the firer's head at low elevations, the large end only of the sleeve target is presented to the firer. Comparison is made of the cones and

TABLE III

Range (yards)	*Possible Hit Percentage*
100	99.0
200	82.1
300	63.8
400	46.2
500	27.9
600	18.4
700	12.5
800	9.0
900	6.6
1000	4.8

targets at 100 yards and 600 yards range in Figure 3. Possible hit percentages at target angles between 0 and 90 degrees are shown in Table IV.

TABLE IV

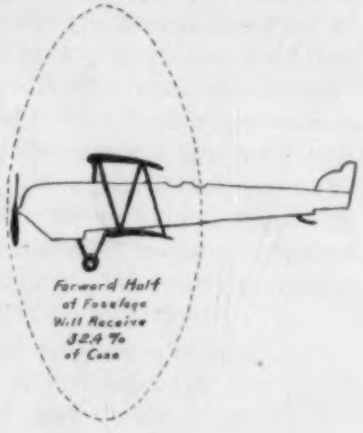
(Target Angle)

Range yds.	0°	15°	30°	45°	60°	75°	90°
	Hit Percentages						
100	99	99	99	99	99	99	99
200	67	72	76	79	80	81	82
300	37	46	53	58	61	63	64
400	23	29	35	40	45	47	48
500	14	18	22	25	26	27	28
600	11	14	16	17	18	18	18
700	7	9	10	11	12	13	13
800	5	7	7	8	8	9	9
900	4	5	6	6	7	7	7
1000	3	4	4	5	5	5	5

Using Table IV, it is possible to obtain the approximate maximum possible percentage of hits fired at a towed target when its elevation, slant range, and direction of flight are known. These two latter factors vary considerably in towed target flights, and it is necessary to arrive at the average slant range and direction of approach before the table is used. The true efficiency of fire at towed targets can then be arrived at by placing the actual hits made in any given firing in ratio to the possible results.

Data for the percentages of possible hits on airplanes themselves may be obtained and tabulated in a manner similar to Table IV. The antiaircraft bullet cone to scale at 600 yards is shown in Figure 4 superimposed upon the front half of an A-3 attack plane. Disregarding the wings and landing gear, the front half of the plane presents an area of about 5.5 feet by 14.0 feet or 77 square feet. Then, by using the law of chance (Figure 2), we find that at a slant range of 600 yards the possible number of hits is 32.4 per cent of the shots fired. The front half of the fuselage only is considered because it contains the vital parts of the plane and its personnel. The wings and landing gear are disregarded because hundreds of bullets may pass through them without forcing the plane to land.

One interesting use of dispersion data is in the analysis of a method of antiaircraft machine gun fire which has frequently been suggested: that of laying the gun in front of the moving airplane and allowing the target to fly through the cone of fire. At first thought, this method seems simple and sure, if somewhat wasteful of ammunition. All machine gun fire, however, may be said to be wasteful in much the



COMPARISON OF CONE TO 30-ft ATTACK PLANE AT 600 yds.

Figure 4

same manner, because of the dispersion of the weapon. Against targets on the ground, if a few bullets in each hundred are effective, such results, with the added moral effect of the heavy fire, justify the large expenditure of ammunition. Hence it seems quite reasonable and not unduly wasteful for a platoon of machine guns or even a company to direct the fire of its guns in front of a hostile plane and to hold it there until the plane passes through. Unfortunately, except at very close ranges and under certain other favorable conditions the hit probability is altogether too small for this firing method to be considered effective. To demonstrate the truth of this statement, let us work out the probabilities for a single gun firing at a plane. We shall assume a constant speed of 140 miles an hour, which is about the speed of the late types of attack planes. As a first example we shall consider an airplane passing parallel to the gunner's front at a slant range of 600 yards. (Figure 5.)

At this range the approximate size of the vertical cone of fire is 34.0 feet high and 14.4 feet wide. If the gun fires 600 rounds per minute, then ten bullets will pass through an ellipse of this size in a single second. But the plane moves 140 miles per hour, or 205 feet per second. The forward half of the fuselage of the plane, which con-

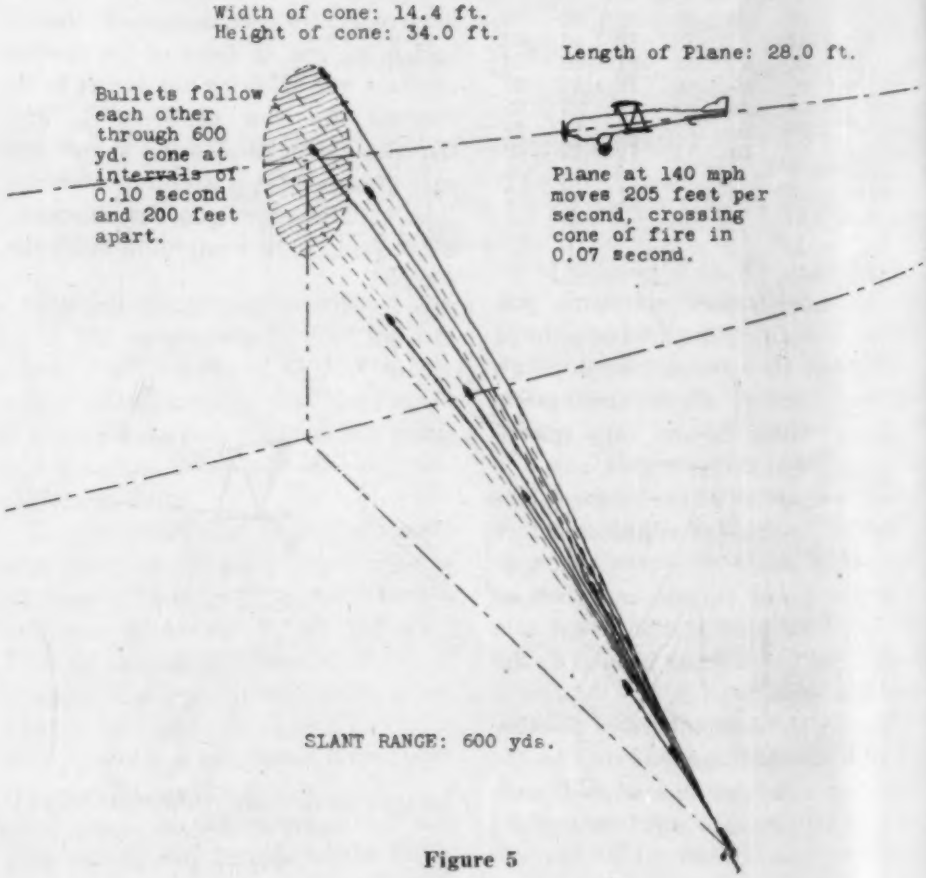

Width of cone: 14.4 ft.
Height of cone: 34.0 ft.
Length of Plane: 28.0 ft.
Bullets follow each other through 600 yd. cone at intervals of 0.10 second and 200 feet apart.
Plane at 140 mph moves 205 feet per second, crossing cone of fire in 0.07 second.
SLANT RANGE: 600 yds.

Figure 5

tains practically all of the vital parts of its mechanism and also the pilot and the observer, is about 14.0 feet in length. This is exposed to some part of the fire while it travels a distance equal to the width of the cone 14.4 feet plus its own length, or 28.4 feet. As the periods during which the plane is entering and leaving the cone of fire are complementary, this amounts to the same thing as considering the plane to be entirely within the cone while it flies 14.4 feet. Measured in time this is 14.4/205 of a second.

Now, Figure 4 shows the comparative sizes of the cone and the target. By the law of chance we have seen that 32.4 per cent of the bullets fired with correct aim will hit the target. Hence the moving target will be hit by 32.4 per cent of the fire for 14.4/205 of a second. As there are ten bullets per second, the average number of hits possible in one laying of the gun is:

$$10 \times \frac{14.4}{205} \times 0.324 \text{ equals } 0.227.$$

For various ranges up to 1,800 yards, Table V shows the fire effect on targets which pass once through the cone of fire of a single gun, while in parallel flight.

Even if a plane passes across the muzzle of a firing gun at a distance of one foot, at which, of course, dispersion is negligible, the gunner will not be sure of hitting the plane, even with perfect aim, more than one time in each laying. However, as each laying takes several seconds, only a limited number of layings can be made while the plane is within reasonable range. Column 3 of Table V indicates the number of layings necessary for a single gun to insure one hit upon the front half of an attack plane when the aim is perfect. These same figures, of course, also indicate the number of guns necessary to make a single hit when all guns are laid once with correct aim.

TABLE V

Range (yds.)	*Average Hits With Correct Aim in One Passage of The Target Through the Cone of Fire*	*Number of Passages Through Cone Necessary to Insure a Single Hit*
100	0.68	2
200	0.53	2
300	0.39	3
400	0.29	4
500	0.25	4
600	0.23	5
1000	0.11	10
1400	0.09	11
1800	0.07	15

Against targets moving in perpendicular flight (flight towards the firer) at elevations of 500 feet or more, the results of this method are nearly as unsatisfactory. When it is remembered that an airplane moving at 140 miles per hour, in any straight flight, passes from a point 1,000 yards distant to a position over the firer in less than 15 seconds, the only conclusion which can be drawn is that the "fly-through" method of fire is almost useless because the maximum possible hits per gun is so small. It is patent that continuous point blank fire with sights aligned directly on the target is desirable against targets diving at the gunner or passing overhead at low elevations.

A rough comparison between continuous fire and "fly-through" fire can be drawn by using Tables IV and V. Let us take the example of a target in parallel flight, at an average slant range of 600 yards, which is within range for 18 seconds. The average angle of the target to the trajectory

will be about 40 degrees, and the average maximum possible percentage of hits will be (Table II) about 15 per cent. A single gun will fire 180 shots in 18 seconds, 15 per cent of which, or 27, can hit the target. By the "fly-through" method, if we assume that a gun can be relaid accurately every 3 seconds, the number of possible hits is 18/3 x 0.23 (Table V), or 1.38 hits.

When we consider the whole subject of the fire efficiency of infantry antiaircraft machine guns, it is obvious that the ideal to be striven for is to reduce the dispersion of the antiaircraft cone until it approaches the ground fire cone, and to hold the cone continuously upon the target. We have seen that the relatively large antiaircraft cone is caused by the mechanical limitation of the antiaircraft adapter and the human element in directing the fire. The Infantry, due to the requirement of extreme mobility, must discard the thought of any such heavy and intricate method as mechanical control of fire direction. A reduction in dispersion can be accomplished, in a minor degree, by a mechanically perfect adapter, but the greatest factor in constricting the antiaircraft cone of fire lies in the perfection of training of the individual gunner. The placing of the cone upon the target and keeping it there will also be accomplished in large part by proper training. This, of course, is first a matter of the perfection of an antiaircraft sight or methods of fire adjustment by observation of tracer bullets. Important work along these lines is now being done, and when the problem is solved, training will become the one big factor in bringing machine gun antiaircraft fire up to the high standard of ground fire efficiency.

The Origin of a Nickname

From the Notebook of "General Experience"

"FIGHTING JOE" HOOKER got his sobriquet through an error of a newspaper writer.

In the course of a brief telegraphic dispatch occurred the words, "Fighting—Joe Hooker" and the telegraph editor mistook this for a nickname of the general and so printed it. However, the name fitted well and was soon widely adopted.

Antiaircraft Training for Machine Gun Units

Capt. Ira E. Ryder, 13th Infantry, 1st Corps Area
Machine Gun School

AVIATION today is making almost unbelievable strides. Millions of dollars are being spent yearly on experimental work alone. The changes and improvements are so rapid that, one might say, what is new today is old tomorrow. The possibilities are so far reaching, so great, no one dares to predict what the near future will bring forth. Airships for commercial use and public carriers are here to stay. No one will deny the fact. The great question before the military mind is what part will the airships play in the next war, and to what extent will they be employed? Certainly no one can answer this question until the time comes.

Is the Infantry wide awake to these great possibilities? Is the Infantry training her troops in every known way and means to combat these ships of the air in the next war? In other words, are we keeping up with the great progress now being made in aviation? To those who have given this matter little or no thought, or to those who are only lukewarm on the subject, it might seem that we have not quite reached our stride. However, we are not dormant. Experimental work and training courses are being mapped out, studied and tested, in order that we may have the latest and best methods in training the Infantry for this antiaircraft work.

Capt. Harry J. Collins, an instructor in the Machine Gun Department at Fort Benning, Ga., and recently senior instructor at the First Corps Area Machine Gun School, Underhill Center, Vermont, has improved and worked out here a course in antiaircraft firing that has proven to be an excellent one, and provides splendid training for machine gun units.

The course has been so favorably commented on by such a large number of officers of various grades, who observed the firing, that surely the Infantry should know about it, in order that it might be used by other machine gun units for antiaircraft training. Another splendid feature of this course is that it requires only a small amount of material to construct the range.

The course of instruction and firing is divided into eight distinct steps or phases, each of which is progresssive and prepares the firer for the succeeding one. Upon the completion of the range fiiring and instructions, efficiency tests are conducted by firing on a towed sleeve target at elevations of five hundred, ten hundred and fifteen hundred feet. All firing, except on the towed sleeve target, is preceded by two "dry runs" for the purpose of teaching position and instilling confidence in the gunner. In all positions, the tank machine gun shoulder-rest is used, adjusted to suit the firer. (See photograph.)

Position of Gunner, Showing Use of Tank Shoulder Rest

Sub-Course No. I

FIRST AIMING AND FIRING EXERCISE

An X target is used and placed one thousand inches from the gun on a three-foot by five-foot target frame, at about the same height as the gun. A coach, by changing elevation and deflection, aligns the sights of the gun on the target by means of a Belgian aiming device and when ready commands "Fire." Ammunition and scoring are explained on score card.

Sub-Course No. II

STATIONARY ELEVATED TARGET. ONE TARGET LENGTH LEAD

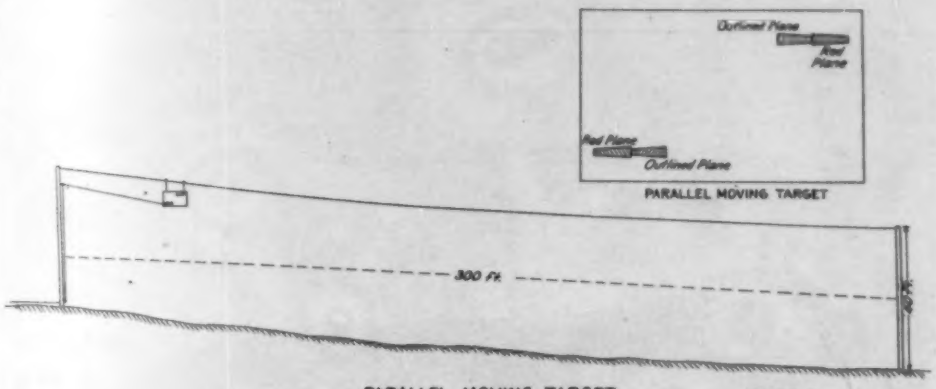
Target as shown in Plate No. I. This target is suspended from a cable, at a height of about forty feet.

The coach lays the gun, by means of the Belgian aiming device, on the head of the red plane, and calls "Ready." The firer then moves his gun as he thinks it should be pointed to be laid on the outline plane, and then fires a single shot. This procedure is repeated for ten shots. The remaining ten shots are fired by the gunner without assistance from the coach, endeavoring to place the shots in the out-

Score Card for Antiaircraft Machine Gun Course, 1st Corps Area Machine Gun School, Underhill Center, Vermont

	Target	*Points*	*Score*	*Ammunition Fired*	*Percentage*
1,000 Inches Sub Course No. 1	Bulls Eye and Outer Circle Stationary	Bulls Eye 1 pt. Circle 1–2 pt.	2	15 Rounds Solid Ball	2
2,000 Inches Sub Course No. 2	1 Target Length Lead Stationary	Shot in Outline Plane 2 pts. Red Plane 1 pt.	4	20 Rounds 1–in–5 Tracer	4
2,000 Inches Sub Course No. 3	1 Target Length Lead Moving at 6 ft. per Sec.	5 pts. for each shot in the outline plane	10	40 Rounds First 5 in each 20 Solid. Tracer balance 1–in–5.	2
2,000 Inches Sub Course No. 4	1 Target Length Lead Moving at 12 ft. per Sec.	5 pts. for each shot in the outline plane	25	40 Rounds First 5 in each 20 Solid. Tracer balance 1–in–5.	5
Plunging-Getaway Target Sub Course No. 5	Target Moving at 10 ft. per Sec. Large Red Plane	10 pts. for each shot in Red Plane Possible 300	30	30 Rounds 1–in–5 Tracer	3
Plunging-Getaway Target Sub Course No. 6	Target Run at 20 ft. per Sec. Large Red Plane	10 pts. for each shot in Red Plane Possible 800	80	80 Rounds 1–in–5 Tracer	8
Plunging-Getaway Target Sub Course No. 7	Target Run at 30 ft. per Sec. Large Red Plane	10 pts. for each shot in Red Plane Possible 1200	100	120 Rounds 1–in–5 Tracer 60 rounds Getaway 60 rounds Plung'g	10=1.1%

Total ammunition for course: Ball, 223 rounds; Tracer, 72 rounds.
Qualification 1%. Divide number of hits on target by No. rounds fired.



line plane. Only every other loop in the belt is loaded.

The primary purpose of this sub-course No. II is to teach the gunner the correct lead necessary for firing on a stationary elevated target. Ammunition and scoring, see score card.

Sub-Course No. III

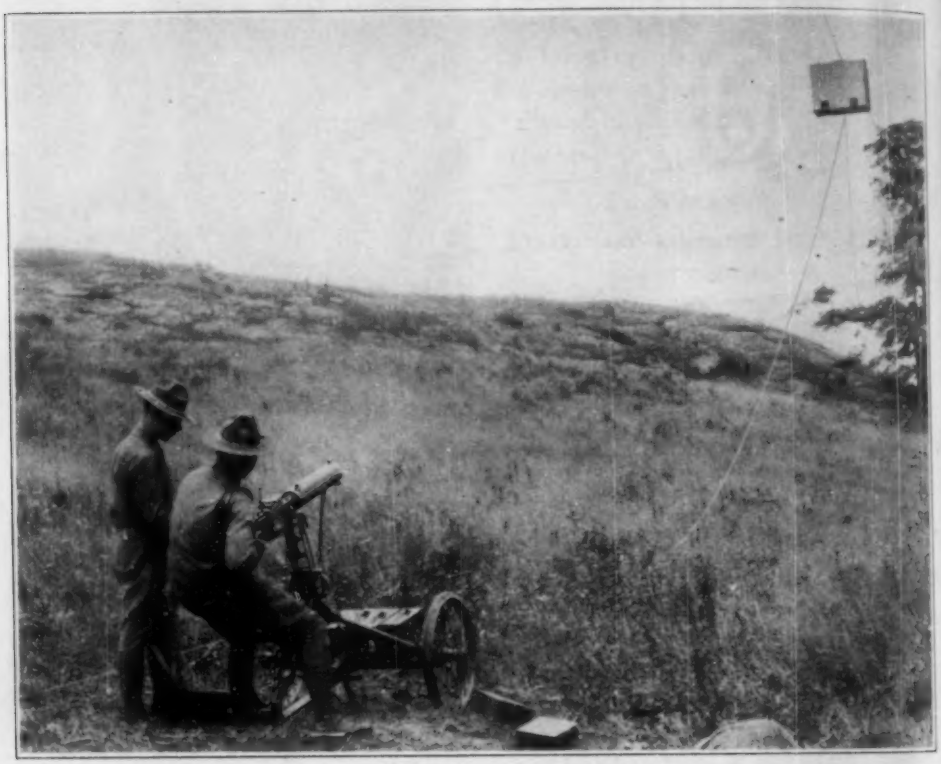
Paralleled Moving Target

The airplane in lower left hand corner of frame represents a plane flying to the gunner's right. The airplane in upper right hand corner represents a plane flying toward gunner's left. (See Plate No. I.) The target is moved back and forth on an elevated cable by the aid of small ropes operated on wooden drums, which insures uniformity in speed. The target should move across the gunner's front at the rate of about six feet per second

The coach lays the gun, same as course No. II, and signals "Ready." On signal from the officer conducting the firing, the target is moved towards the gunner's right, at the same time the firer keeps his eyes trained on the target (outline plane), and at the command "Commence Firing" given by the officer, he fires his first twenty rounds at the target endeavoring to fire one shot at a time as he follows the target across his front. The remaining twenty shots are fired in the same manner except the target is reversed and is towed towards the gunner's left. This gives the gunner training in taking the necessary lead when firing on a target moving across his front from either direction. It also gives him confidence and practice in firing on targets moving at a faster speed. Ammunition and scoring, see score card.

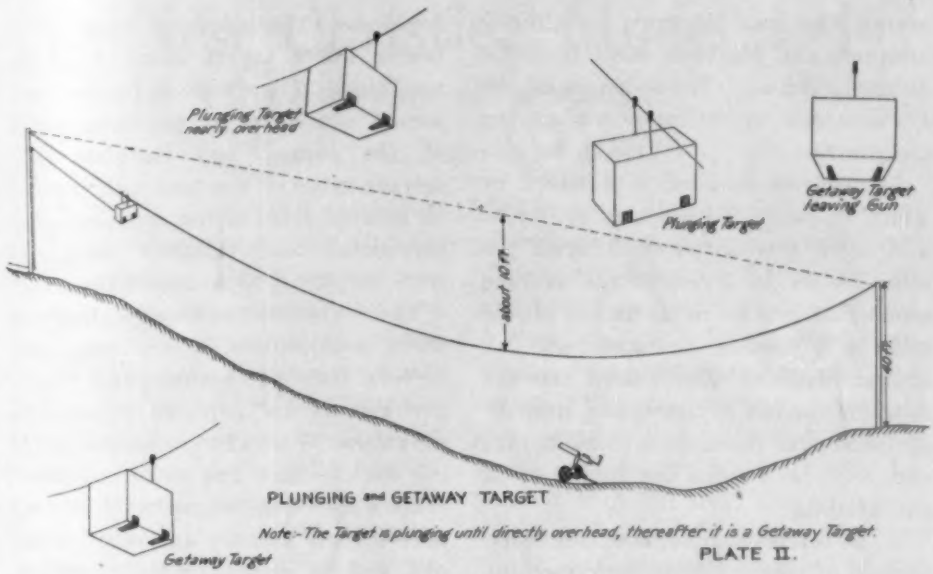
Sub-Course No. VI

Same as sub-course No. III, except that the plane is towed at a rate of twelve feet per second. The primary purpose of this course is to teach the gunner the correct lead necessary to hit a target which is moving across his front. It is hard to teach the average soldier, and make him understand, that such a lead is necessary when firing on fast moving targets. This target, moving at a speed of about twelve feet per second, and two thousand inches from the gun position, represents a plane flying across the front of the gunner at about a slant range of sixteen hundred feet and traveling at a rate of about eighty or eighty-five



Firing on Plunging Target

Parallel Moving Target


Plunging Target nearly overhead
Plunging Target
Getaway Target leaving Gun
about 10 ft.
40 ft.
Getaway Target
PLUNGING and GETAWAY TARGET
Note.—The Target is plunging until directly overhead, thereafter it is a Getaway Target.
PLATE II.

miles per hour. Scoring and ammunition, see score card.

Sub-Course No. V

PLUNGING AND GETAWAY TARGET

Sufficient slack is left in cable so as to permit a drop of about ten feet in the center. (See Plate No. II.) This gives the target a diving or plunging effect, coming directly at the firer. As the target passes over the head of the gunner it moves up and away after completing the dive.

This permits the gunner to fire on a target diving, directly overhead, and as it leaves him moving on its upward flight on the getaway. The box frame is suspended from a steel cable about forty feet high. (See Plate No. II.) The red targets are so fastened to the frame as to give the effect of a plane diving directly towards the firer, passing overhead, and moving away. The diving and getaway target is so arranged that its speed can be regulated by means of small ropes attached to and wound around wooden drums. The speed in this course is about ten feet per second as shown on score card.

This gives training in firing on a rapidly moving target coming dircetly in line with the gun, diving from a high angle, passing overhead and moving rapidly up on the getaway. This is the method planes usually employ in attacking targets on the road.

Sub-Course No. VI

Same as course No. V, except target is now moving at a rate of speed of about twenty feet per second. Training given here same as sub-course No. V. Scoring and ammunition, see score card.

Sub-Course No. VII

PLUNGING AND GETAWAY TARGET

Target same as in courses V and VI, except that it is now moving at a rate of about thirty feet per second. Training same as in sub-course No. V. Ammunition and scoring, see score card.

In using these courses, the school was very fortunate in being able to

secure the loan of four antiaircraft adapters and Mathews carts from the Infantry School. The ordnance adapters were used by the troops while firing the course.

In order to establish a standard by which to judge the shooting ability of a unit in this antiaircraft firing—in other words, to arrive at the average number of hits an organization should make on the course—one officer and two noncommissioned officers fired over the course a number of times, and an average score was taken from these firings and used as a basis for qualification and grading.

It is interesting to note the comparison of scores for the four machine gun organizations that completed the course. There was a little less than one per cent hits, or about the same as could be expected from firing on a towed sleeve target under favorable conditions. There were no funds or personnel available for the construction of the course, and therefore only salvage material was used such as could be secured from almost any post quartermaster, and company mechanics were employed to construct the range.

The course meets many requirements when ammunition expenditure is a factor. Only two bunderd and ninety-five rounds are required to complete the course. This affords excellent training for machine gun units in antiaircraft work. The course could be fired once for preliminary and once for record, and by increasing the tracer ammunition, a higher percentage of hits and a greater degree of proficiency could be obtained.

Navigating an Army

From the Notebook of "General Experience"

ON the night of September 12, 1898, the British forces marched through a moonless desert against Arabi Pasha. It was highly important that the march be made with accuracy and in silence.

The services of a naval officer were secured as "navigator" and he guided the column by the stars. The attack resulted in the surprise and defeat of the enemy.

The New Christie, "Model 1940"

Tank and armored car combined

MAJ. C. C. BENSON, Cavalry

WALTER CHRISTIE, inventor, for exceptionally meritorious work in inventing, perfecting, and constructing, at his own expense, a fighting machine for the armed forces of the United States. Mr. Christie, a private citizen, devoted five years of continuous effort and all of his personal means to perfecting a superior weapon. Despite financial hardships, he steadfastly refused to sell his invention abroad, and resolutely faced discouragements and delays incident to its acceptance by the United States. He has shown extraordinary patriotism and has rendered conspicuous service to the cause of national defense.

Although the above citation is fictitious and consequently is not recorded in the War Department archives, it may serve as an unofficial appreciation of what Mr. Christie has done. The five years of effort spent on his latest model is by no means the full measure of this inventor's work along similar lines. He had previously built a series of tanks and gun carriers for the War and Navy Departments, and before that had produced a number of successful commercial vehicles.

Twenty-five years ago he built a front-wheel-drive car. His ideas were apparently too far ahead of the time, for the front-wheel drive car is just now beginning to pay its way commercially. He also built fire engines which refused to wear out, and heavy duty trucks for many unusual purposes. One of his latest commercial products is a chassis suitable for mounting a yard crane. An automotive job that presents unusual difficulties appeals to Christie and keeps his fertile mind engaged until he can work out a solution.

When the World War focused attention on our need for tanks and gun carriers, Christie interested himself in their construction. He had much to learn. From the start he was impressed with the need for a machine that could travel on either wheels or tracks, and he stuck doggedly to that idea through all of the development work that he carried out under the supervision of the Ordnance Department. Each of the machines built during this series of experiments had many good points, but always there was some feature that baffled the designer. These machines cannot be classed as failures, and yet no one of them was an outstanding success. They are interesting now as showing steps in the evolution of the superior fighting machine which Christie has now produced.

Christie went on his own in 1923 with a check for one hundred thousand dollars from the Ordnance Department in his pocket. He was then nearly sixty years old and might well have sat down to rest awhile. However, he did not choose to sit. The tank problem had beaten him in the first campaign, but he refused to accept defeat. He went to work in his own shop with a few skillful helpers and the backing of his own private means. His hundred thousand melted away, and nearly double that sum besides,

A Stiff Climb

during the five years that he worked on the new model. Financial folly, perhaps, but Christie was more interested in solving his problem than he was in making money. His confidence in himself was justified, for he has solved the problem and now offers us the new Christie, "Model 1940."

"Model 1940" is a suitable designation for this machine because it is easily ten years ahead of its time. In building it, Christie applied all the knowledge he had gained in previous work to a new set of basic specifications which he drew up for himself. He saw the need for reserve power in the engine, greater elasticity in the running gear, more speed, and more responsive controls; and set himself the task of building these features into his new machine. He retained the best feature of his old machines—their ability to use wheels on the road and caterpillar tracks across country. Tactically and mechanically his ideas show keen appreciation of what the fighting man needs. In the new design he placed the fighting compartment in front where the driver can see and the gunner can shoot; the power plant he put in rear where it can work efficiently without obstructing the driver's vision or the gunner's aim. His power plant—at present a three hundred and thirty-eight horsepower Liberty engine—supplies ample reserve power for hard pulls. Instead of having to creep up a slope in low gear, as all our other machines do, the new Christie draws on its reserve and charges uphill in high. This feature is vitally important because modern antitank defense relies heavily on the inability of present machines to ascend slopes rapidly enough to avoid destructive fire from antitank weapons. These weapons have been greatly improved since the World War, but the best of them will have difficulty in hitting a machine that travels across country at forty miles an hour.

To attain such speed it was necessary for Christie to develop and perfect a new type of running gear. Light weight, strength, long life, and extreme flexibility are its outstanding features. By a clever arrangement of powerful springs and strong levers, this new running gear reduces the unsprung weight of the machine to a minimum and enables it to traverse uneven ground rapidly without excessive vibration. At twenty-five miles an hour the machine goes over a twelve-inch log with scarcely a ripple. The elimination of vibration and shocks saves the driving mechanism from rapid deterioration and permits members of the crew to devote more attention to combat missions. The strength and endurance of the track have been proven repeatedly

in tests and demonstrations. Last November this machine made a trip on hard surfaced roads from Fort George G. Meade to Gettysburg and return—one hundred and forty-four miles—between breakfast and lunch. On wheels, making the seventy-two miles to Gettysburg, with only such delays as were incident to traffic, the running time was a little over two hours. On caterpillar tracks, returning from Gettysburg, the running time was two hours and thirty-five minutes—an *average* of nearly twenty-eight miles an hour. To make this average, which is respectable going even for a pleasure car, the machine had to move along at the rate of forty-five miles an hour or better whenever traffic permitted. Running gear that can stand such punishment shows championship quality.

The power and speed of this machine would be of comparatively little use without responsive controls. Here again Christie has scored a distinct success. The driver can operate his steering levers with the pressure of a single finger; he can turn the machine about in half its length going either backwards or forwards, and can cut figure eights at a speed that would shame an international polo pony. The physical effort required to guide this machine, either on wheels or tracks, is so slight that the driver can give most of his attention to what is happening out in front. When he has to change pace or direction he can do so easily, in a flash. Under skillful hands like those of Christie's helper, Leo Anderson, this machine has the agility of a wildcat.

The new Christie is now undergoing thorough tests to determine definitely its powers and limitations. As the main features of these tests have already been published on the screen, in

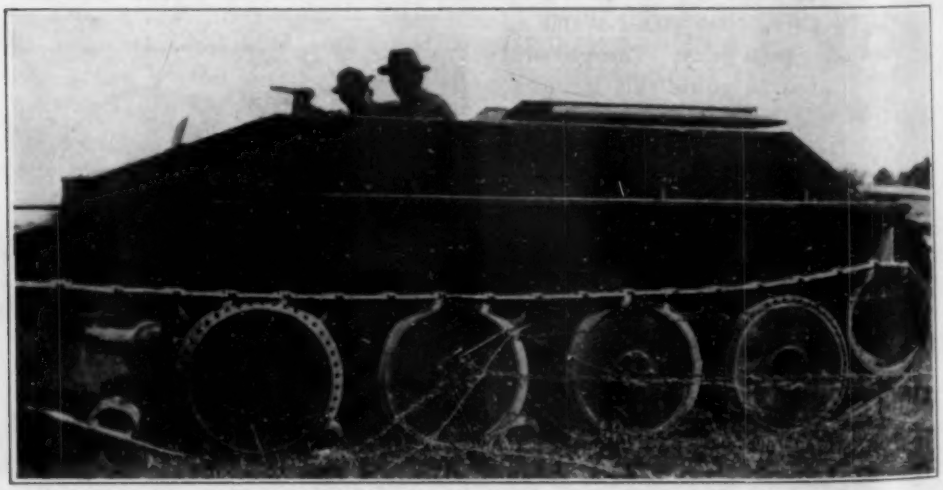
Up and Over

Sunday pictorial sections, and in the daily papers, there seems to be no reason for withholding this information from the Army. The hastily assembled machine that was used in the initial demonstrations at Fort Myer and Fort George G. Meade during October and November of last year has since been practically rebuilt. Its present appearance is shown in the accompanying photographs. We may disregard the details of the fighting compartment because they can be changed to meet the particular needs of those who adopt the machine. As it stands, the machine weighs seventeen thousand two hundred pounds. The addition of a turret and heavier guns, if desired, would increase this weight consider-

Side-Hill Work

ably, but the machine has plenty of reserve power and is strong enough to carry anything up to twelve tons with out serious alteration. It can be arranged to accommodate several machine guns, a 4-inch mortar, or a 75-mm. gun; and a crew of three men. Its average cruising speed across country is about twenty miles an hour. In speed tests conducted recently under the supervision of American Automobile Association officials, the Christie made forty-two and fifty-five hundredths miles an hour on tracks, and sixty-nine and twenty-three hundredths miles an hour on wheels. The distances were accurately measured and the time was recorded automatically by electrical timing devices. The test runs on tracks were made on a level field of sandy loam; the road tests on a straightaway stretch of concrete highway. We cannot expect to utilize these high rates of speed except in emergency, and then only momentarily; that the machine can attain such speeds without mishap indicates sound principles of construction, and stamina.

In a demonstration given at Fort Meade on July 19th, the Christie showed surprising ability to negotiate a swamp. With cleats (growsers) bolted to the track plates, it waded into muck and water that appeared to be quite impassable, and moved about at will. Unfortunately, the muck was only four feet deep at the worst part of the swamp; consequently, the machine could not fully demonstrate its powers. It crossed the swamp several times with apparent ease, pushing a mass of mud and vegetation ahead of its bow, and leaving a clean cut canal in its wake. With a machine of this kind, landing on an enemy's shore will be less of a gamble than heretofore. Instead of using landing beaches that are protected by underwater barbed wire and machine guns, the attacker may plow his way ashore at some unprotected point and take the enemy in flank or rear. It would be interesting to see what effect a hundred Christie machines, as a part of the attacking force in maneuvers, would have on our plans for defending the Panama Canal. Without similar machines at their dis-



Through the Wire

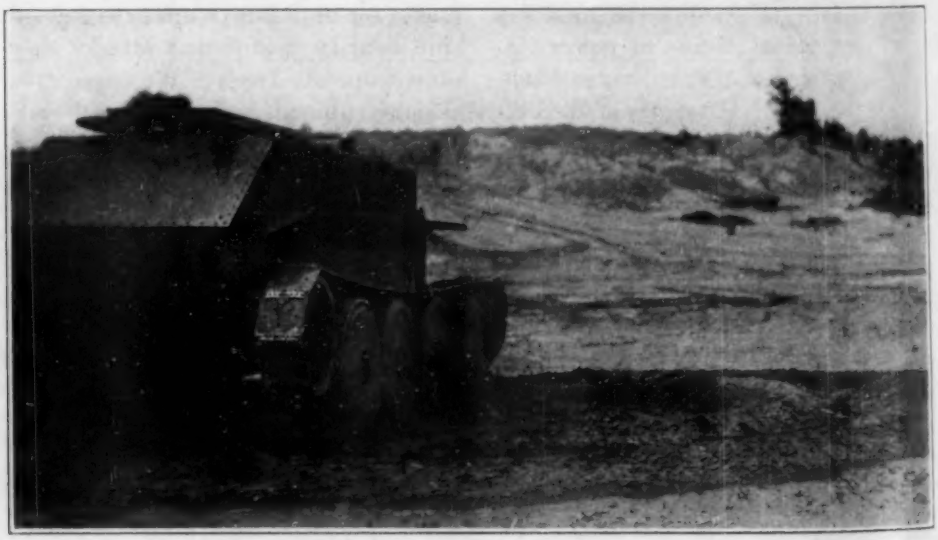
Real Flexibility Over Bumps

posal, the defenders would be seriously handicapped; with them, the plan of defense would be strengthened.

Other tests justify the conclusion that this machine can serve the Army in many ways. It can cross a seven-foot trench, climb a forty-five degree slope, surmount a three foot vertical wall, crush barbed wire entanglements, and crash through underbrush. It would go roughshod over mesquite and cactus. In bad weather it can operate more effectively than any other combat agency. It can be made impervious to gas attacks. It endows the members of its crew with a sense of power; instead of being isolated, individuals subject to the manifold terrors of the battlefield, they become a team in which each man raises the morale of his companions. They have confidence in the ability of their machine to surmount great obstacles, and in their own ability to carry the fight to the enemy. In estimating the combat value of this machine, we should consider fully its effect upon morale—the human element is still supreme. If we consider the Christie simply as a power plant, with highly efficient running gear and certain space that can be utilized for the "pay load," its possible uses are more easily understood. It becomes a powerful tractor, a cross-country cargo carrier, or a front line fighting machine, according to details of superstructure determined by the branches concerned. A single type of standard chassis can be made to serve all branches.

First let us consider some of the combat uses. These will naturally depend upon the chief characteristics of the weapon—mobility, partial protection for the crew, fire power, and shock action. The most obvious purpose of this weapon is to destroy the enemy's tanks; for until our troops have reasonable security against tank attacks, they cannot operate freely. We oppose the enemy's aircraft primarily with aircraft of our own; his cavalry with cavalry; and similarly, his tanks with tanks. With its speed, power, and all-around fighting ability, the Christie would fill admirably the role of tank-destroyer. When used in this capacity, it would lend valuable assistance to all branches. Cavalry, with its tactical doctrines built on mobility, fire power, and shock, is naturally akin to the Christie. The cavalry needs armored cars for security and reconnaissance work; and tanks that are fast enough to accompany the maneuvering mass,

or even extend its operations in combat. For exploitation, pursuit, and raids, the Christie would be invaluable to cavalry. It could help materially to protect cavalry, on the march or in bivouac, from the enemy's tanks and aircraft. Infantry needs similar protection on the march and in camp; in combat, it needs tanks to precede the foot troops, to work in the closest cooperation with them, and to exploit their successes. A fast machine like the Christie can cover much ground laterally, and can do work for the Infantry far more thoroughly than can a slow one. Under modern conditions, the fast machine will be operating long after the slow one has been destroyed by antitank fire. The smaller Coast Artillery antiaircraft weapons, and searchlights, if mounted on the Christie chassis, would acquire strategical and tactical mobility that would double their usefulness. The heaviest Mobile artillery pieces could be moved about and supplied with ammunition far more rapidly than is possible with present means. The new Chemical Warfare mortar, a remarkable weapon of great power, would find many new uses if given the cross-country mobility that the Christie can provide. This machine could be used with terrible effect to carry tons of casualty-producing chemical agents into the enemy's lines. One hundred men with fifty Christie machines could put over a gas attack that would dwarf the most powerful concentrations used during the World War, and there would be no laborious preparations to warn the enemy of his danger. Driving by compass, they could operate at night, in fog or smoke, in sleet or rain; and whether our chemically equipped air forces were available or not, the enemy would get no rest. The Field Artillery could mount a 75-mm. gun on this chassis, and thus solve the vexing problem of providing a self-propelled gun for special purposes. By standardizing the bulk of the automotive combat vehicles in any mechanized force that may be created, the Christie chassis would greatly simplify all matters connected with procurement, sup-



A Quick Turn

ply, replacement, repair, maintenance, control, and operations of the force as a whole. Standardization of the fighting machine chassis is a vitally important factor in the efficiency of a mechanized force. This fact bears directly upon the selection of automotive equipment for units of all branches that will participate in the formation of our future mechanized divisions.

Suitable superstructure would convert the Christie into a useful cargo carrier. Men, machine guns, ammunition, rations, gasoline, oil, grease, and supplies of all kinds, could be transported rapidly on the road and across country. Supply dumps could be farther to the rear without jeopardizing efficient service, the road net restrictions would be less binding, reloading would be minimized, and carrying parties would be less in demand. A man with fifty pounds on his back, or a pack mule with two hundred, can go through woods and over rocks where no machine could operate. In the open, a single Christie could deliver more supplies in one trip than could be loaded on a whole pack train. In swampy ground where a mule or man would bog down, the Christie would pull through. With fleets of cross-country supply vehicles of this type the Germans in their drive of March, 1918, could have smashed through the Allied lines. Our own operations in the Argonne, where roads were simply obliterated, could have retained much of their initial impetus had it been possible to hasten supplies forward on cross-country cargo carriers. The Engineers, Signal Corps, Medical Corps, and all supply agencies whose activities carry them well forward into the combat zone, could find many uses for a machine of this type.

Tactical application should accompany technical progress in the development of new weapons. We now have an opportunity to secure a fast cross-country fighting machine which I believe is the best in the world—the "Model 1940" Christie. To fit a weapon of this type into the combat team, for either close cooperation or independent action, will require drastic changes in our present combat tactics. What changes will be necessary cannot be fully determined until war tests our theories. In the meantime, the subject deserves serious study. The Infantry School has begun to study problems that involve the employment of a mechanized brigade, and despite serious handicaps, has made considerable progress in its efforts to stimulate thought on this subject. The Infantry is vitally concerned not only in the offensive uses of the new weapon, but also with defense against it. The introduction of this fighting machine will affect all combat branches and supply agencies. No one branch or service can solve all phases of the problems it presents. Christie has given us in his new machine more technical progress than Great Britain has secured during the past ten years from the expenditure of some sixty-five million dollars. However, in tactical methods and practical experience with fast fighting machines, the British Army is far ahead of us. Technical excellence will avail us little until tactical thought in our service as a whole catches up with the procession.

A Technique for Engaging Moving Targets with the 37-MM. Gun

CAPT. JOHN RICE, Infantry [1]

RECENTLY a high-ranking British army officer was asked, in effect, the following question:

"Considering (1) the continuous radical changes and improvements in types of vehicles and weapons (tanks, armored cars, troop and cargo carriers, and infantry supporting weapons to combat them); (2) the consequent increase in possible speed and the probable large number of rapidly moving targets on the future battlefield; (3) the production of newly developed matériel in small numbers only and without general issue to troops in time of peace—how should infantry and infantry close-supporting troops be trained in order that, in time of emergency and rapid issue of more modern battle equipment, they will be best prepared to receive it and to absorb the necessary technique to handle it effectively?"

His answer, in substance and insofar as it related to the engagements of moving targets, was:

"First, determine the guiding principles which are necessary in order successfully to engage targets moving at any speed. Second, from those principles develop for the engagement of such targets a technique which is applicable to the slower, less powerful weapons now in the hands of our troops, but which can be applied, with only minor changes, to the latest developed weapons of which we have knowledge. Third, give this technique to the Service and require training, practice, and proficiency to the best capability of the weapon at hand. Then, finally, when the Ordnance Department furnishes the improved weapons, the Infantry will be experienced and trained in the basic principles of the technique to be used, and the only modifications required will be those necessary to suit the mechanical features and characteristics of the new weapon."

This statement is especially applicable to a situation which has existed in our Service for several years with regard to the Infantry's antimachine gun and local antitank weapon, the 37-mm. gun. The weapon at present issued to the Service is the old model of 1916—a very accurate, rather powerful, excellent antimachine gun, stationary target weapon of the World War period. It is not, however, an adequate antitank weapon, because of slow manipulation in elevation and traverse and insufficient muzzle velocity to cause its shell to penetrate present day armor plate at a reasonable range.

Development has been progressive with this weapon since the close of the war, with the object of ultimately developing a weapon of about the same caliber, with the same excellent features of accuracy, light weight, and mobility in the hands of a small infantry team, but possessing the desired antitank qualities. A vastly superior 37-

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mm. gun is in existence today. The latest development has a seven hundred and twenty-five foot-second increase in muzzle velocity, and the shell does pass through on a twenty-five degree angle at five hundred yards or one-half inches at fourteen hundred yards of the best modern armor plate and bursts on the far side. It has a seventy degree (twelve hundred mil) traverse and can be operated very rapidly (as a "free" gun) in elevation and traverse. However, in spite of improved characteristics and changes in design, its type of sights, its weight, its manipulation, and consequently the technique and teamwork necessary to handle it effectively, are surprisingly similar to those now prescribed in TR 420-30 and other regulations for the 37-mm. gun, model of 1916.

At the present time our Service receives no training and is not required to pass any proficiency tests in engaging moving targets with the 37-mm. gun.

In view of the tremendous improvements in the gasoline engine, the prospect of increasing numbers of rapidly moving armored targets in future battles, our present developments and ideas for the use of the new 37-mm. gun (or a similar weapon) for local protection against these objects, and believing therefore that proficiency in engaging such targets is highly essential to members of howitzer companies, the method hereinafter described has been devised during the past year by the Howitzer Weapons Section of the Infantry School.

It is offered as a simple, practical, rapid field method for engaging a target moving in any direction and at any speed. The organization and outline of the duties of the gun crew are equally applicable to the old and the new weapon. (The time factors used with the new weapon would naturally be based upon the time-of-flight tables for its shell.) Using the model 1916 gun, the method has produced a most desirable average of direct hits against representative targets which were towed across the range at various and varying speeds to include twenty-five miles per hour, and approaching at various angles.

Although no ammunition is now available for this type of marksmanship, the practicability and speed of the method may well be appreciated and excellent practice experienced by simulating fire upon automobiles traveling along some main highway in the vicinity of the training area or garrison. The method is offered to the Service for its consideration with the idea that this, or some similar method if it is better, should be incorporated in TR 420-30 (Technique of the 37-mm. gun) and that a standard of proficiency in speed and accuracy of adjustment of fire in this type of firing should be required of all 37-mm. gun units.

The description of the technique is divided into two parts: Theory, and Organization and Duties of the Gun Crew.

I. THEORY

In order to get hits on any moving target we must be able to do the following three things:

1. Rapidly determine the necessary "lead" (deflection) to counteract for the angular speed (in mils) of the target. For the first round, this is done by making a measurement with the field glasses. Subsequent adjustment is based upon observation of the preced-

ing burst, as described in T. R. 420-30.

2. Make frequent changes in range and deflection, based upon the observed movement of the target and upon observation of the "strike" of preceding shells.

3. *Rapidly apply to the gun* these frequent changes in range and deflection.

ANGULAR SPEED VS. ACTUAL SPEED

Actual speed is the rate at which the object is moving, in terms of miles per hour, yards per second, or the like. Angular speed is the rate at which the object moves, in terms of mils per second—the number of mils through which an object passes in a given number of seconds as it crosses the front either directly or at some oblique angle.

Due to the fact that our deflection discs are graduated in mils (and for three or four other good simplifying reasons) we shall avoid all further thought of actual speed, and think only in terms of *angular speed.*

DEFLECTION DATA FOR THE FIRST ROUND

Theoretically (and practically), the amount of lead required is that angle (in mils) through which the moving target may be expected to travel during the time that the shell is in flight (gun to target). Ordnance time-of-flight tables show that it takes the shell (L E for Mod. 1916 gun) roughly one second to reach 200-600 yards, two seconds to reach 600-1000 yards, three seconds to reach 1000-1400 yards, and five seconds to reach about 1600 yards.

For our purposes we can use that table as follows to obtain the amount of deflection for the first round: If a target is at *about* 400 (800, 1200, 1600) yards from the gun, the observer measures the distance (in mils) through which the object passes in 1 (2, 3, 5) second. ***This reading,*** which he takes on the mil scale in his field glasses, is the desired deflection, lead, off-set, or what you will.

Example: A moving target appears, observer (gun commander) quickly estimates range as about *eight hundred* yards. He immediately looks at the target through his field glasses and places the end of his horizontal mil-scale on the spot where the moving object then is. Holding his glasses still, he counts *two* seconds (one thousand and one, one thousand and two) and takes the reading of the number of mils through which the object (target) has moved during that period. If, for instance, the target has moved fifteen mils to the right then "Right 15" is the deflection to be initially set on the gun.

The data for the first round must be determined and the round fired just as quickly as consistent with reasonable accuracy. In getting that first shell away, rapidity must not be sacrificed to obtain extreme accuracy. The first shell must get to the vicinity of the target (as close as possible) in a minimum of time.

II. ORGANIZATION AND DUTIES OF THE GUN CREW

In order to gain speed in the application of data to the gun, a gun crew is increased from three men to four, and their duties are:

Gun Commander (observer): Selects targets, determines data, gives fire orders (initial, adjustment and fire for effect), observes continuously during firing (immediately noting and ordering any necessary changes in deflection or range).

Sight Setter: Takes position close to the sights so that he can readily manipulate range disc and deflection disc. He keeps his fingers on these discs at all times, repeats all fire orders, sets deflection disc and range disc as ordered; checks or resets them immediately after each round is fired, and whenever the sights are properly set, announces to the gun-pointer, "Check."

Gun-Pointer: Takes position lying along the left trail so that he can place his eye at the sight and at the same time readily manipulate the elevating and traversing handwheels with his hands. He keeps his eye at the sight (never losing the moving object in his field of vision) and, by means of the elevating and traversing handwheels, keeps the intersection of the cross-hairs constantly on the target. As often as possible ("at will") whenever the sight-setter has announced "Check" and the cross-hairs are laid on the target, the gun-pointer announces to the assistant-gunner (No. 1) "Fire." The gun-pointer maintains his hold on the elevating and traversing handwheels and keeps his eye as nearly as possible at the sight when the gun is fired and re-lays the cross-hairs on the target promptly thereafter.

Assistant Gunner (No. 1): Takes position lying along the right trail, loads the gun at the initial fire order, presses the trigger thumb piece at the gun-pointer's command "Fire," and immediately after each round is fired unloads and reloads the piece as rapidly as possible. Assists the gun-pointer in remedying any stoppages.

Note: Firing is done at a rapid rate and is continuous ("at will") from the time the initial fire order is given until the target is demolished, disabled, or out of sight, or until the command to cease firing, changes in fire data (adjustment orders) are given and applied at odd intervals whenever necessary in order to place and keep the bursts on the target. Adjustments in range, with fairly good visibility and in order to gain greater speed, are made on the basis of a 100-yard bracket (instead of 200). Adjust rather low on the target and if the target is moving rapidly toward the gun, adjust fire a little short and fire rapidly, letting the target run into the fire.

If the target changes direction, the observer carefully notes rapidity of change of range and takes more or less deflection on the following basis:—For a target moving across the front at right angles to the direction of fire, take the full indicated lead; at 67½ (or 247½) degrees, take nine-tenths (.9) of the indicated lead; at 45 (or 135) degrees, take seven-tenths (.7); at 22½ (or 102½) degrees, take four-tenths; at 0 (or 180) degrees, take no lead (in deflection).

That practice makes perfect is very true in the observation and adjustment of fire. A little practice in making changes based on observation soon develops, as it does in duck shooting, a true sense of how much change is necessary under given conditions.

Training Chart and Drill Schedule for a Rifle Company

An explanation of a training chart method, prepared for a National Guard company, but applicable to any company

CAPT. MYRON P. LUND, 135th Inf. (Minnesota National Guard)

THE training of the National Guard is divided into two phases—armory training and field training. The purpose of the field training period is to permit practical demonstrations of the theoretical work taught during the armory training period. It is obvious that the groundwork of armory training will be reflected in the benefit derived from field training. Armory training is a prerequisite to field training.

The objective of armory training should be "complete instruction in every subject to each individual." This objective leaves nothing to be desired in the scope of training and it represents what might be termed the supreme mission of training.

The National Guard desires and aims to be efficient, so that it may accomplish its mission, so that it may conduct itself properly under the conditions on the field, and, so that its present nucleus may permit of proper wartime expansion.

The efficiency of the National Guard must be sustained and improved through its leaders. The chain of command, from the highest commander to the squad leader, represents the stabilized power of the National Guard. It is through this chain of command that progress in efficiency may be maintained.

The efficiency of leaders must be sustained and improved through the medium of supervision. This supervision is not that of outside agencies, but rather an interlocking teamwork that extends throughout the chain of command, resulting in a series of cooperative endeavors. The supervision of outside agencies is on a particularly high plane and the assistance from that source should not be underestimated; yet it is the chain of command that holds the balance of power, and it is this resource that the National Guard should try to develop. Subordinates must appreciate the fact that it is the duty of superiors to supervise, and superiors must appreciate the fact that it is the function of subordinates to be led.

Initiative in leaders is a desirable and commendable virtue, and every opportunity should be afforded for its development. Initiative, regardless of its capacity, should not be permitted to displace supervision. Supervision, as a fundamental of the military, should be as inbred as discipline. A debatable question in National Guard training today is whether or not the scheme of training relies too much on the initiative of leaders instead of on the supervision of subordinates.

In the final analysis, efficiency implies supervision, and supervision implies mandatory requirements in training.

The responsibility for company training lies on the shoulders of the

company commander. This responsibility is inherently his and cannot be delegated. Naturally the company commander is interested in systems and methods of training, and particularly in a method that is adaptable to his armory objective—"complete instruction in every subject to each individual." Such a method of training implies a training chart on which may be represented the training of each individual of the company. "Notes on National Guard Training" urge that company commanders prepare training charts in order that progressive training may be graphically represented. This suggestion of the Militia Bureau is not at present a requirement, but there can be no doubt that in a very short time the keeping of training charts will be made a mandatory feature of National Guard training.

The purpose of a training chart has been stated to be, "a means of graphically representing progressive training." While this statement of purpose is undoubtedly true, yet it fails to set up in the mind of a company commander the desire to start a training chart system. His obvious conclusion is that it is merely a system of grading the individuals of his company. He has a working knowledge of the qualifications of the members of his company and it instills no enthusiasm in him to set up a system which to his mind purports to be a grading sheet for the perusal of instructors or inspectors. The viewpoint of the company commander must be directed into the proper channel by placing the emphasis on the most important purpose of a training chart system.

The customary practice under the present drill schedule system is to teach four different subjects in four thirty-minute periods during an armory drill. The progress of the entire company, except recruits, is uniform. Advancement is made by conformity to the drill schedule and not by conformity to the capacity of the individual to learn. The individual must follow the pace of the drill schedule, instead of the drill schedule following the pace of the individual. It is illogical to assume that all the individuals can learn with the same speed; therefore, it becomes necessary to have a system of instruction that has flexibility to afford equal opportunity for the assimilation of knowledge by the keen and by the slow.

A system of this nature contemplates individual instruction, as contrasted with mass instruction. Under the present system there can be no assurance that the intermittent drill attender will receive instruction in subjects which were taught during his absence. The training chart system, with its scheme of individual instruction, assures to each individual complete instruction in every subject—a definite compliance with the objective of armory training.

It has been suggested that there are three major weaknesses in the scope of National Guard training:

1. Lack of a definite, complete, and permanent drill schedule for unit organizations.
2. Failure to hold regular noncommissioned officers' schools based on a definite objective.
3. Failure of officers to study.

The subjects of basic training are readily adaptable to a permanent outline. The comparatively few changes in training regulations will not disturb the form of such an outline. A permanent drill schedule embraces

every subject given for instruction by a unit organization, and it conveys at a single glance a comprehension of the requirements of complete training. It will eliminate much unnecessary work by the unit commander and it will preclude the omission of any subject from the training given on the armory floor.

The subject matter of noncommissioned officers' schools should be taken from the permanent drill schedule in its regular sequence. The objective of noncommissioned officers' schools should be, "training of the noncommissioned officer for use as an instructor on the drill floor." A noncommissioned officer should be a leader and he should be required to assume the obligation of an instructor. The noncommissioned officer should not be taught on the drill floor. He should be used in the capacity for which he was intended.

The feature of a permanent drill schedule compiled as a detailed outline will give little opportunity to omit any phase of the instruction that pertains to any subject. The requirement of a detailed outline will compel adherence to its form. Being compelled to adhere to a detailed outline, it will become an absolute necessity for an instructor to be familiar wth every phase of a subject given for instruction. An incidental function of a detailed outline is to compel study.

A training chart system will tend to compromise the three deficiencies of National Guard training.

The training chart system herein described contemplates:

1. Regularly held noncommissioned officers' schools.
2. A permanent drill schedule, with each subject as a complete lessen.
3. The establishment of a class system that permits individual instruction.
4. The use of noncommissioned officers as instructors on the drill floor.
5. The use of officers as supervisors on the drill floor.

The rudiments of good teaching imply that the method which reduces the system of instruction to individual requirements is the most efficient. The detailed outline of subjects of any system should remain as constant as an outline for a field order. The application of these two principles places instruction on a scientific basis from which practical training charts may be devised and progressive training definitely indicated and observed.

The primary purpose of a training chart system is to provide a means that will permit complete instruction to each individual in every subject. The secondary purpose is to provide a means that will permit of the employment of the noncommissioned officers to the fullest extent. The third purpose is to provide a means that will show at a single glance the progress that each individual has made in armory instruction at any given time during the training year.

The requisites of a training chart are:

1. The training chart must be practical. Its scheme of operation should be so devised that the chart will reflect accurately the state of training of any individual concerned.
2. The training chart must be efficient. It should consolidate on one sheet the titles of all subjects for instruction, the names of all individuals who are taking instruction, and a means of indicating the number of subjects in which an individual has shown proficiency.
3. The training chart must be simple. Its upkeep by the responsible officers should consume a minimum of time.

A platoon training chart and a detailed statement of all subjects for instruction are shown herewith.[1] The company chart and the company headquarters chart are similar to the platoon chart.

The company headquarters training chart is kept by the first sergeant, who is charged with the responsibility of training of the headquarters group. Being a potential officer, his duties should embrace training as well as administrative work.

The platoon chart is kept by the platoon leader. The names of the members of the platoon are arranged by squads to preserve the permanent squad organization.

The company chart is kept by the company commander. The names of all of the members of the company are listed by grade in alphabetical order. This chart is posted on the bulletin board for the guidance of the members of the company.

The detailed statement of the subjects for instruction includes all the subjects pertinent to the training of the unit organization. Each subject is called a lesson and is numbered as Lesson 1, Lesson 2, and so on.

This chart system may be begun at any time, but preferably after the field training period. The set of charts begun at that time should be kept current until the conclusion of the following field training period. At that time new charts are prepared and the system is begun anew.

The key to the successful operation of this system is the noncommissioned officers' school. The importance of this school cannot be overestimated. Experience has shown that the most advantageous time to hold this school is directly after the drill period.

The purpose of noncommissioned officers' school's is to qualify these men in the subjects for instruction, thereby making them available as instructors on the armory drill floor. Theoretically, it should be unnecessary to teach a noncommissioned officer on the drill floor. The school is so scheduled that the noncommissioned officers are qualified in each subject before it is taught on the drill floor. This plan creates a staff of at least twelve instructors for a company.

The noncommissioned officers' school coordinated with armory drill training is as indispensable to that training as military courtesy is to military discipline.

To insure thoroughness in execution and knowledge, the company commander requires each noncommissioned officer, at this school, to demonstrate and explain each movement and action listed under each lesson. This is necessary in order to insure competent instructors on the drill floor.

When each noncommissioned officer has shown proficiency in a lesson, he is given a Q, meaning qualified, in the square after his name and under the particular lesson.

The company commander assigns to each noncommissioned officer two lessons for which he will be the instructor on the drill floor. The adaptability of the noncommissioned officer will determine the subjects assigned to him. He will, however, be required to qualify in all subjects as well as to specialize in the two assigned to him.

On the first drill night after this system is inaugurated, the members of

[1] Pages 271 to 280.

the company are divided into classes, with from five to eight men in a class and one or two noncommissioned officers as instructors. Copies of Lesson 1 are given to the instructors, who take up the work of that lesson. The officers of the company act as supervisors, going from class to class, assisting with the teaching if necessary, and observing the conduct of the classes.

At the end of the drill, questions are asked and demonstrations required from each individual to determine his proficiency. Each individual who is proficient is given a Q after his name under Lesson 1. These individuals will advance to Lesson 2 at the next drill. Those who failed to qualify will be required to take further instruction in Lesson 1 at the next drill.

Each subject represents a definite objective for each man, and when he has attained that objective he is rewarded with a Q. The psychological factor is apparent, inasmuch as each man receives public recognition for his military knowldege.

The subjects are taught in the sequence which they are shown on the platoon chart. This sequence has been arranged as the proper order in which the subjects of a rifle company should be given. This arrangement has been so devised that when an individual has received Q's in the first twelve lessons, he has received sufficient training in fundamentals to warrant his appointment as private first class. When he has received Q's in the next seven lessons, his training has progressed so far that he becomes eligible to promotion to corporal. When he has completed the remaining five lessons, he has received instruction in every subject required and is eligible for promotion to sergeant. It is possible for any individual to earn his promotion on paper, and the only duty left for the platoon leader is to determine whether or not that individual possesses the qualities of leadership necessary to the proper execution of his duties.

If forty-eight noncommissioned officers' schools are held during the training year, it will be possible to qualify these men in all the lessons prescribed during the first year of operation of this system. During armory drill an individual with previous training should be able to qualify in nineteen lessons during the training year. But the system calls for real work.

The real value of this system becomes apparent when the second year's work is begun. It will require very little time to requalify those who have qualified in the same subjects the previous year. Qualifications earned the second time are designated Q2, those earned the third time Q3, and so on.

This system will arouse the enthusiasm of the men because of its simplicity and practicability. They can grasp a view of the requirements of their entire training, and inasmuch as each lesson represents a definite goal, they are made to feel that they are continually accomplishing an objective. So much stress is laid on accuracy of demonstration and explanation by each individual that a feeling of confidence is instilled. Having aroused enthusiasm and instilled confidence in his men, the company commander is relieved of the necessity of stimulating pride, for enthusiasm and confidence beget pride.

SAMPLE PLATOON TRAINING CHART

1ST PLAT., CO. K, 185 INF. LT. BACON

Q—Qualified.

	Pvt. 1st Cl. Training												*Corporal Training*							*Sergeant Training*				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Sgt. Griffith	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q									
Sgt. Hestad	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q									
1st Squad																								
Corp. Hanson	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q									
Pvt. Dueland	Q	Q	Q	Q	Q	Q																		
Pvt. 1cl. Olson	Q	Q	Q	Q	Q	Q	Q	Q	Q															
Pvt. Nelson	Q	Q	Q	Q	Q	Q	Q																	
Pvt. Carson	Q	Q	Q	Q	Q																			
Pvt. 1cl. Dahl	Q	Q	Q	Q	Q	Q	Q	Q	Q															
Pvt. 1cl. Larson	Q	Q	Q	Q	Q	Q	Q																	
Pvt. Winge	Q	Q	Q	Q																				
2nd Squad																								
Corp. Dahl	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q									
Pvt. 1cl. Cum'gs	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q														
Pvt. Vangen	Q	Q																						

DETAILED STATEMENT OF SUBJECTS FOR INSTRUCTION

Lesson 1—INSTRUCTION DISMOUNTED, WITHOUT ARMS.

TR 50-15[2]. CT page 13-17[3-4]

FALL IN	Right: FACE	Half step: MARCH
ATTENTION	Right half: FACE	Right step: MARCH
FALL OUT	About: FACE	Backward: MARCH
REST	Hand: SALUTE	By the right flank: MARCH
AT EASE	Forward: MARCH	To the rear: MARCH
Stand at: EASE	Double time: MARCH	Change step: MARCH
Parade: REST	Squad: HALT	
Eyes: Right	Mark time: MARCH	

Face in marching and advance from a halt.
Face in marching and mark time from a halt.
Face in marching and advance, being in march.
Face in marching and mark time, being in march.

REQUIREMENT FOR QUALIFICATION:

Explanation and demonstration of each movement.

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[2] The Infantry Association can furnish Training Regulations promptly at regular government prices. It offers complete sets of Infantry Training Regulations, bound in three Kalamazoo binders, at $9.65 the set.

[3] COMPANY TRAINING, The United States Infantry Association. Price, $2.10 the single copy; $1.25 the copy in lots of ten or more.

[4] Other recommended reference books:

BASIC FIELD MANUAL NO. 1 (Infantry Drill), *new tentative War Department manual presenting Training Regulations matter in revised and especially convenient form*, The United States Infantry Association. Expected off of the press in September, 1929.

BASIC MILITARY TRAINING, The United States Infantry Association and The National Service Publishing Company. Price $1.75 the single copy; $1.40 the copy in lots of ten or more.

R. O. T. C. MANUALS, VOLS. I-IV, The National Service Publishing Company (The United States Infantry Association distributors).

For details of contents, form, and prices of all of the above named books, see announcements on page 10f of this JOURNAL.

Lesson 2—INSTRUCTION DISMOUNTED, WITH ARMS.
TR 50-20. CT. page 17-24. BFM.

Order: ARMS
Port: ARMS
Inspection: ARMS
Present: ARMS
Rifle: SALUTE
Right shoulder: ARMS
Left shoulder: ARMS
Trail: ARMS
Parade: REST
Fix: BAYONETS
Unfix: BAYONETS
With ball cartridges: LOAD
Ready AIM Squad FIRE
Suspend firing
Cease firing

REQUIREMENT FOR QUALIFICATION:

Explanation and demonstration of each movement.

Lesson 3—DRILL, THE SQUAD.
TR 420-50. CT. page 454-458. BFM.

Organization
FALL IN
Count: OFF
Right: DRESS, FRONT
Open ranks: MARCH, FRONT
Close ranks: MARCH
Stack: ARMS
Take: ARMS
Right oblique: MARCH
In place: HALT
Resume: MARCH
As you were
Take interval, 2 To the right, 3 MARCH, 4 Squad, 5 HALT.
Assemble to the left: MARCH
Right turn: MARCH
Squad right: MARCH
Squad right about: MARCH

REQUIREMENT FOR QUALIFICATION:

Explanation of each movement.
Study of TR 420-45. CT page 448-453.

Lesson 4—MILITARY COURTESY.
AR. 600-25. NGR. 36.

Definition
Hand Salute
  Saluting distance
  In armory
  In automobiles
  In cafes
Reporting as orderly
Speaking to Captain
Message from Captain to Lieutenant
Officer entering tent
Mess etiquette

MILITARY DISCIPLINE.
AR. 600-10. NGR. 36.

Definition
Persons subject to discipline
Manner of enforcing discipline
Value of discipline

REQUIREMENT FOR QUALIFICATION:

Explanation of each subject, with demonstration.

Lesson 5—MARKSMANSHIP, RIFLE.
TR 150-5-10. CT page 109-157.

Definition
Sighting and aiming
  Position of bull's eye
Positions
  Prone
  Sitting
  Standing
  Kneeling
Gun sling adjustment
Holding breath
Trigger squeeze
  Calling shot
Rapid Fire
  Bolt operation
Nomenclature
  Name 30 parts
  State 5 facts
Care and cleaning
  In armory
  After firing
Wind rule
Wind gauge rule
Elevation rule
Mirage
Zero of rifle
Canting rifle
  Effect
Use of score book
  Plotting shot
Value of marks
Telephone language

REQUIREMENT FOR QUALIFICATION:

Explanation and demonstration of each position and subject.

Lesson 6—BAYONET.
TR 50-25. CT. page 24-34.

Signals
- Guard
- Short guard
- Long thrust
- Short thrust
- Jab
- Parry
- Butt strokes
- Slash
- Cutover

Positions
- Rest
- Guard
- Short guard
- Long thrust
- Withdraw

Short thrust
Withdraw
- Parry right
- Parry left

Positions
- Butt strokes
  - Vertical
  - Horizontal
- Slash
- Jab
- High port

Disarming opponent
- Method

Injuring opponent
- Method

REQUIREMENT FOR QUALIFICATION:
Explanation and demonstration of each signal and position.

Lesson 7—EXTENDED ORDER SQUAD.
TR. 420-85. CT. page 561-566.

Purpose of extended order
General rules
Rules for loading and firing
SUSPEND FIRING
CEASE FIRING
As skirmishers: MARCH
Assemble: MARCH
FOLLOW ME
KNEEL
DOWN
Prepare to rush: UP
Use of cover
Positions of leaders

DRILL and COMBAT SIGNALS
TR. 420-40. CT. page 443-445.

Rules for whistle signals
Rules for hand & arm signals
Signals
- Forward
- To the rear
- By the flank
- Halt
- Lie down
- Squad
- Section
- Platoon
- Squad column
- Section column
- Leaders join me
- Double time
- Quick time
- Change direction
- Range
- As skirmishers
- As skirmishers, right
- Assemble
- Are you ready
- I am ready
- Commence firing
- Fire faster
- Fire slower
- New target
- Suspend firing
- Cease firing
- Fix bayonets
- Assault fire
- Enemy in sight, large numbers
- Enemy in sight, small numbers

REQUIREMENT FOR QUALIFICATION:
Explanation and demonstration of each movement, position and signal.

Lesson 8—INTERIOR GUARD DUTY.
TR. 135-15. CT. page 57-78.

Duties of personnel
- Commanding Officer
- Field Officer of the Day
- Officer of the Day
- Commander of the guard
- Sergeant of the guard
- Corporal of the guard
- Buglers of the guard
- Privates of the guard
- Orderlies

Formations
- Under arms
- To form the guard
- Position of leaders
- Action of sergeant
- Parade prisoners

Posting Relief
- Method of posting
- Position of corporals

Dismiss Relief
- Method

Orders
- 12 general orders
- Special orders

FORMAL GUARD MOUNTINGS
TR. 135-5. CT. page 50-57.

Methods of mounting guard
- Name successive steps

Compliments of guard
- When given

Raising & lowering flag

REQUIREMENT FOR QUALIFICATION:
Explanation of each subject.

Lesson 9—ARTICLES OF WAR
NGR. 36.

Reading articles of war
A. W. No. 1 & No. 2
2d & 3d paragraphs of A. W. No. 28
A. W. No. 54 to No. 96 incl.
A. W. No. 104 to No. 109 incl.
When read to enlisted men
Purpose of A. W.

CITIZENSHIP
Form of government
Branches of government
Executive
Legislative
Judiciary
Manner of representation

COURTSMARTIAL
NGR. 37

Discipline
Compared to Regular Army
Persons subject to military law
Kinds of courtmartial
General
Special
Summary
Power to try
Records of trial
Fines and confinement

REQUIREMENT FOR QUALIFICATION:
Explanation of each subject.

Lesson No. 10—FIRST AID
TR. 112-5.

Object of instruction
General rules for wounds
First aid packet
Contents
Method of applying
Bleeding
Arterial, venous, capillary
Tourniquet
Method of making
Method of applying
Length of time to be used
Fracture
Method of applying splints
Drowning
Schaeffer method of resuscitation
Heat stroke
Treatment

PERSONAL HYGIENE
TR. 113-5. AR. 850-125.

Definition of hygiene
Cause of disease
Prevention of disease
Health rules
Drinking
Evacuation
Bathing
Care of feet
Shoes
Socks
Treatment of blisters

REQUIREMENT FOR QUALIFICATION:
Explanation of each subject.

Lesson 11—INFANTRY PACK
TR. 50-80. CT. page 35-41.

Assemble cartridge belt
Attach first aid pouch
Attach canteen cover
Attach carrier to haversack
Attach intrench tool carrier
Making roll

DISPLAY OF EQUIPMENT
TR. 420 90. CT. page 42.

TENT PITCHING
TR. 225-5. CT. page 325-328.

Formation of Company
Commands
Form for shelter tents: Take interval,
To the left: MARCH, Company: HALT,
Pitch tents
Duties of front rank man
Duties of rear rank man
STRIKE TENTS:

REQUIREMENT FOR QUALIFICATION:
Explanation and demonstration of each subject.

Lesson 12—SCOUTING AND PATROLLING.
TR. 200-5. CT. page 282-324.

Characteristics of scouts
Concealment
Prone position
Preparing to change
Jumping up
Running
Dropping down
Creeping
Crawling
Map reading
Five conventional signs
Orientation
Watch and sun
North star
Compass
Magnetic azimuth
True north
Azimuth of object
Observation
Searching ground
Estimating size of enemy
Messages
Contents
Sketches
Purpose
Scouts mission with assault platoon
Action through woods
Action under fire
Scouts mission with support, platoon
Reconnaissance
Patrols
Essentials of formations
Uses of patrols
On the march
On outposts
Before attack
Reconnaissance
Combat
Observation posts
Operation
Snipers
Mission

REQUIREMENT FOR QUALIFICATION:

Explanation and demonstration of positions and subjects.

Lesson 13—DRILL, PLATOON.
TR. 420-50. CT. page 459-466.

Organization
In two ranks form platoon: MARCH, FRONT
File closers on the left flank: MARCH
Platoon right: MARCH, Platoon: HALT, or Forward: MARCH
Right turn: MARCH, Platoon: HALT, or Forward: MARCH
Squad right Column right: MARCH
Right by squads: MARCH
Right front into line: MARCH, Platoon: HALT, FRONT
On right into line: MARCH, Platoon: HALT, FRONT
About: FACE, At trail, Forward: MARCH, Platoon: HALT
Route step: MARCH
At ease: MARCH
Right by twos: MARCH
Squads left front into line: MARCH
Right by file: MARCH
Twos left front into line: MARCH

REQUIREMENT FOR QUALIFICATION:

Explanation of each movement.

Lesson 14—MUSKETRY.
TR. 145-5. CT. page 79-108.

Definition
Range estimation
Target designation
Rifle fire and effect
Fire discipline
Fire control
Landscape targets
Safety precautions

REQUIREMENT FOR QUALIFICATION:

Explanation of each subject.

Lesson 15—EXTENDED ORDER, SECTION AND PLATOON.
TR. 420-85. CT. page 566-572.

Base of deployment
Use of signals
Halted by down
Halted by range
Posts of leaders, guides and runners
As skirmishers
As skirmishers, right
Squad column (fr. col. of sqds.)
Squad column, right (fr. col. of sqds.)
Section column (fr. col. of sqds.)
Squad column from skirmishers
Section column from skirmishers
Section column from squad column
First section as skirmishers and
Second section squad columns
Assemble by squads
Assemble by sections
Assemble platoon
Advance by rushes
Advance by infiltration
By squad from right: RUSH
On such road: REFORM

REQUIREMENT FOR QUALIFICATION:

Explanation of each movement with special emphasis on positions and commands of all leaders, and distances and intervals of all units.

Lesson 16—AUTOMATIC RIFLE
TR. 320-25. CT. page 352-374.

General description
Operation
Cooling
Mechanical movement
Forward
Rearward
General data
Weight
Kinds of fire
Stripping
Order of
Assembling
Order of
Stoppages
Main cause
Care and cleaning
Chamber
Gas system
Gas adjustment

TR. 150-30. CT. page 181-206.
Nomenclature
Name 20 parts
Sighting
Large peep hole
Positions
Prone
Standing
Walking
Trigger squeeze
Rapid fire
Use in combat
Rate of fire
Automatic fire
Semi-automatic fire
Value to squad.

REQUIREMENT FOR QUALIFICATION:

Explanation of each subject.

Lesson 17—COMBAT PRINCIPLES, SQUAD.
TR. 420-105. CT. page 587-600.

- Approach march
  - Formations
  - Duties of:
    - Scouts
    - Squad leader
    - Second in command
  - Passing through long range fire
- Building up fire line
  - Duties of leader
  - Advance by rushes
  - Advance by infiltration
- Fire fight
  - Duties of leader
- Assault
  - With barrage
  - Without barrage
  - When delivered
  - Duties of leader
  - Position of leader
- Reorganization
  - Duties of leader
- Pursuit
  - Duties of leader
- Defense
  - Duties of leader
- Listening posts
- Mopping up
- Flank combat squad
- Point of advance guard
  - Formation
  - Purpose
  - Connecting files
- Point of rear guard
  - Formation
  - Purpose
- Connecting group
  - Purpose
- Outguards
  - Cossack post
  - Sentry squad
  - Purpose
- Estimate of situation
  - Six point method
- Combat order
  - Five point method

REQUIREMENT FOR QUALIFICATION:

Explanation of each subject.

Lesson 18—COMBAT PRINCIPLES, SECTION.
TR. 420-110. CT. page 601-616.

- Organization
  - Section headquarters
- Route march
  - Position and duties of leaders
- Approach march
  - Formations
    - In small shelled areas
    - In small heavily shelled areas
    - Long range machine gun fire
    - Direct small arms fire
- Positions and duties of leaders
- Attack
  - Methods of advance
    - Fire and movement
  - Duties of leaders
    - Estimate of situation
    - Combat order
  - Position of leaders
- Assault
  - When delivered
  - With and without barrage
  - Position and duties of leaders
- Reorganization
  - Duties of leaders
- Section in defense
  - Organization of ground
  - Position of automatics
  - Counterattack
- Security on the march
  - Advance guard
    - Purpose and subdivision
  - Rear guard
    - Purpose and subdivision
  - Flank guard
    - Purpose and formation
- Security at rest
  - Outpost
    - Purpose and subdivision
  - Outguards
    - Pickets
      - Strength and formation
  - Duties of leader
- March outpost
  - Purpose and formation
- Detached post
  - Purpose and formation
- Flank combat group
  - Purpose and formations

REQUIREMENT FOR QUALIFICATION:

Explanation of each subject with consideration for support section in each step of offensive combat.

Lesson 19—CALISTHENICS.
Vol. 1, Basic Training, page 86.

Breathing exercise (slow)
  INHALE: EXHALE
Toe exercise (rapid)
  Arms backward: CROSS. Rise on toes.
Leg exercise (quick time)
  Hands on hips: PLACE, Raise knees alternately.
Trunk exercise (slow)
  Hands on hips: PLACE, bend trunk right and left
Arm exercise (rapid)
  Arms to thrust: RAISE, thrust arms forward
Neck exercise (slow)
  Arms to thrust: RAISE, turn head right and left

REQUIREMENT FOR QUALIFICATION:
Explanation and demonstration of each exercise.

Lesson 20—RIOT DUTY.
WD. Doc. 882.

Crowds
Mobs
  Methods of dispersion
    Tear gas bombs
    Bayonets
Wedge formations
Squad: WEDGE
To the rear: MARCH
Assemble: MARCH

```
          C
      1R  3F
        4R
   2R         2F
3R               1F
```

Diagonal, guide right: MARCH, Assemble

```
                  C   1F
                      2F
                  3F
              1R
          2R
      3R
  4R
```

Diagonal, guide left: MARCH, Assemble

```
  4R
  3R  C
      2R
          1R
              3F
                  2F
                      1F
```

Deploy: MARCH, Assemble

```
4R  3R  2R  1R  3F  2F  1F
            C
```

REQUIREMENT FOR QUALIFICATION:
Explanation of each subject and formation.

Lesson 21—INSTRUCTION, DISMOUNTED WITH PISTOL.
TR. 50-55. CT. page 34-35.

Raise: PISTOL
Inspection: PISTOL
Load: PISTOL
Return: PISTOL
Firing commands

TR. 320-15.

Mechanical operation
  Effect of gases
Dismounting
Assembling
Nomenclature
  Name 15 parts
  State 5 facts
TR. 150-20. CT. page 158-180.
Care of bore
  Powder and metal fouling
  Oiling
Test of parts
  Safety lock
  Grip safety
  Half-cock notch
  Disconnector
Aiming
Position
  Standing
  Grasping pistol
Trigger squeeze
Rapid fire
Quick fire

REQUIREMENT FOR QUALIFICATION:
Explanation and demonstration of each command and subject.

Lesson 22—COMBAT PRINCIPLES, PLATOON.
TR. 420-115. CT. page 617-648.

- Organization
  - Platoon headquarters
- Route march
  - Position and duties of leaders
- Approach march
  - Assault echelon
  - Support echelon
  - Zone of action
  - Use of cover
  - Communications
  - Security
  - Position and duties of leaders
- Attack
  - Methods of advance
    - Fire and movement
  - Duties of leaders
    - Estimate of situation
    - Combat order
  - Position of leaders
  - Methods of attack
  - Flank protection
  - Aiding adjacent platoon
- Assault
  - Action when held up
- Reorganization
  - With barrage
  - Without barrage
  - Duties of leaders
- Pursuit
  - Duties of leaders
  - Formation
- Platoon in defense
  - Outguard
  - Combat
  - Support
  - Weapons
  - Sector
  - Deployment
  - Organization of ground
  - Counterattack
- Support platoon
  - Description
  - Approach march
  - Formation
  - Distance from assault echelon
  - Duties of leader
- Attack
  - Maneuver unit
  - Mission
- Pursuit
  - Counterattack
- Night operations
  - Reconnaissance
  - Instruction to troops
  - Marches
    - Preparation of equipment
  - Approach march
    - Formation
    - Bayonets
    - Direction
    - Preparation at final halt
  - Attack
    - Action when discovered
    - Advancing attack
  - Assault
    - Weapons used
  - Consolidation
    - All around defense
  - Pursuit
    - Counterattack
- Security on the march
  - Advance guard
    - Purpose and subdivisions
  - Support of advance guard
    - Distance from advance party
    - Position of commander
    - Action when fired upon
  - Rear guard
    - Purpose and subdivisions
  - Support of rear guard
    - Distance from rear party
    - Position of commander
    - Action when fired upon
    - Positions taken by support
  - Rear Party
    - Formations
- Security at rest
  - Support of outpost
    - Duties of leaders
  - Outguards
    - Strength
    - Preparations
    - Number on duty
    - Distance from support
    - Patrolling
    - Conduct of men
- March outpost
  - Purpose and missions
- Convoy escort
  - Convoy
  - Train guard
  - Mission

REQUIREMENT FOR QUALIFICATION:

Explanation of each subject.

Lesson 23—COMBAT PRINCIPLES, COMPANY.
TR. 420-120. CT. page 643-656.

Organization
  Company headquarters
    Command group
    Supply and administrative group
Route march—Assault company
  Duties of commander
  Position of commander
Approach march
  Formations
  Duties of commander
  Position of commander
Deployment for attack
  Orders
    Verbal
Attack
  Duties of commander
Assault
  Duties of commander
Reorganization
  Duties of commander
Pursuit
  Duties of commander
Organization of ground
  Duties of commander
Reserve company in attack
  Missions
  Formations
  Movements
  Duties of commander
    Reconnaissance
  Position of commander
  Flank protection
    Action of commander
Combat Company in defense
  Mission
  Disposition
    Observation line
    Firing line
    Support line
    Combat group
    Strong point
  Command post
Reserve company in defense
  Location
  Mission
    Counterattack
    Flank protection
  Disposition

REQUIREMENT FOR QUALIFICATION:

Explanation of each subject.

Lesson 24—DRILL, COMPANY.
TR. 420-50. CT. page 466-467.

Organization
Platoons in line
Line of platoons
Close column
Close line
Column of squads

From column of platoons:
  Open ranks
  On right into line
  Right front into line
  Form column of squads
  Column right
  Close on leading platoon

From column of squads:
  On right into line
  Right front into line
  Form column of platoons
  Column right
From line of platoons:
  Company right
  Close on right platoon
  Form column of platoons
  Form column of squads
  Form the company
  Dismiss the company
  Company inspection

REQUIREMENT FOR QUALIFICATION:

Explanation of each position and of each movement.

Notes on Machine Gun Marksmanship

A discussion of common errors of procedure, and corrections for them, that should help to bring about better and more uniform results in machine gun marksmanship

CAPT. FORREST E. AMBROSE, Infantry Machine Gun Instructor, The Infantry School

THE range of the *average* scores made by machine gun companies in 1928 was one hundred and twenty-four points. The training methods and procedure show variations of such a nature that this wide range is exactly what could be expected. Something serious is wrong when units that are operating with exactly the same rules, equipment, and presumed objective, obtain such widely different results in a purely mechanical subject.

The object of the present article is to examine the subject of machine gun marksmanship and to point out where improper procedure contributes to wide differences in results. It is hoped that a statement of what is believed to be a correct procedure will open the way for a marked reduction in this great difference and also clarify some of the matters with respect to which there is now a wide difference of opinion.

In marksmanship, the mission is to train gunners individually to operate a machine gun in such manner as to obtain maximum fire effect. The gun is a machine which reacts exactly and in direct proportion to the mechanical skill with which it is operated. Marksmanship training, therefore, is for the purpose of developing mechanical skill in the individual gunner. Any training which is not designed with this object in view is more apt to be wrong than right.

The problems of marksmanship may be divided into three basic divisions: personnel, equipment, and training. We are looking for those points where differences of training or procedure may account for differences in results. When we have found them, we shall be in position to judge whether or not our past procedure has been correct and consistent with our real mission.

PERSONNEL

This subject of personnel presents three important problems in the solving of which there might be a partial answer to our search.

1. In the present Training Regulations 150-35 (Machine Gun Marksmanship) there is the following statement: (Par. 3 *a* (1) (0)).

Every man who is to fire on the range will be put through the preparatory course from the beginning. No distinction will be made between recruits and men who have had range practice, no matter what their previous qualifications have been.

This is far more important than it is usually considered. It does not mean that the experienced man must take as much time or will require as

much instruction as the recruit, but it does mean that he will review the course, step by step, as thoroughly as the recruit; if this takes less time and instruction, well and good. Experienced men may be grouped to facilitate their covering the course more quickly and to enable them to receive special instruction in coaching duties, and they should be examined in each exercise or step as carefully as the other men.

2. Maximum results will be obtained only when the individual soldier is given individual instruction to suit his needs, is tested individually to determine his weak points, and is then given special instruction to cure these. Group instruction is excellent and is absolutely necessary as a foundation, but it must be supplemented by this individual attention, because the mission is to train the individual gunner. Different men receive different impressions from exactly the same things. No one can obtain uniform results from a group of men with only group contact.

3. The character and ability of the instructor has probably a greater effect upon results than any other single element which enters into our discussion. There will inevitably be great differences in the skill and effectiveness of different officers. However, it is believed that this difference now has a much greater effect than it should. Marksmanship is a purely mechanical subject; it is simple and the regulations that cover it are sufficiently thorough to provide the instructor with an adequate text—if he uses it. Even a poor officer should be able to learn such a subject acceptably if he will study. It does not require a brilliant officer to understand it or a superior officer to teach it adequately. If the average or less able officer really studies his subject, really works at his task and keeps his mission intelligently in mind, he should obtain results only a little below those of the better officer, even though the latter does the same thing. It is felt, therefore, that even the wide difference between instructors should not produce all of the difference that actually exists in results.

EQUIPMENT

Under the heading of equipment there are the following subdivisions: preparatory training equipment, guns, ammunition, targets, and ranges.

Preparatory training equipment. This equipment is so simple and so easy to construct that there should be no question of its being made correctly. It must be carefully and accurately made; its every aspect should convey the impression of exactness. Sighting and aiming requires accuracy, and men cannot be taught an accurate operation with inaccurate or carelessly made tools. Preparation of this equipment should start well in advance of the time of its need, and it should be inspected very carefully to see that it is well made.

Guns. The preparation, care and adjustment of guns, both before and during firing, are of extreme importance. This is so obvious that probably few units err materially in this respect. However. it is worth while to enumerate the most important points wherein failure will cause poor shooting.

The tripod should be fitted snugly and firmly to the T-base and always used on the particular T-base which has been specially fitted to it. There

is no virtue in clamping the tripod to the T-base in any way—in fact the regulations prohibit such clamping. It is sufficient that the tripod fit into the T-base firmly, that the T-base be firmly planted in the ground, and that the tripod be weighted with sand bags. In soft ground, it is sometimes advisable to drive stakes into the ground and nail them to each extremity of the base. There should be no play in the serrations on the leg and trail jamming clamps; the elevating mechanism should work smoothly but without looseness. The trunnion block should fit tightly into the cradle (if necessary use washers or shims) and the trunnion pin should fit snugly; there must be no play between the elevating screw and its bracket on the gun (if necessary, fold several cleaning patches and place them between the two parts before putting in the elevating pin). In many of the old, war-time guns the back plate is loose and falls so low as to interfere with the trigger action; this can usually be remedied temporarily by placing a small sliver of wood or a shred of packing material into the groove in the bottom plate to hold the back plate up.

The cover, rear sight, and rear-sight movable base must fit snugly and work smoothly (if these parts cannot be so fitted, they should be replaced). The recoiling parts must fit snugly but work smoothly together and in the receiver; the expedient of hammering in the side plates of the receiver to overcome looseness is accompanied by considerable danger unless done by an expert. Headspace adjustment is of extreme importance and justifies the greatest care; the cone of fire can be moved several mils by wide differences in headspace adjustment. The front and rear packing of the barrel, particularly the former, must be done with care, and must be frequently inspected and constantly maintained; the muzzle gland must be kept tight.

One of the most prolific sources of stoppages is the belt feed lever. The lever itself easily becomes bent, or its pivot becomes worn, or both these things occur, so that the cartridges are not carried fully over against the cartridge stop, which causes failure to feed or recurring short rounds. If new parts are not available for replacement, the lever may easily be bent until it will carry the cartridges over against the stop. The lever should carry the slide to the right until its end protrudes a perceptible amount beyond the side of the cover; this amount varies according to the amount of wear in the parts. To gauge the adjustment by causing the slide to be carried beyond the side of the cover "the thickness of a playing card," as expressed in the present regulations, will not always be correct.

All of the points mentioned are important, but, above all, keep the gun *clean and oiled;* clean and oil it every day or oftener if it is fired a great deal; clean the bore several times a day while firing.

Every gun must be targeted with the barrel in use. The targeting process is very important and must be carefully and accurately done; it should be done by the best gunners available. The targeting process described in the present regulations is a long and cumbersome one and should not be used. In a previous article (1), there is a

(1) See page 589, INFANTRY JOURNAL for December, 1927.

description of a shorter and better process of targeting which, in turn, has been further simplified. The description of this simplified process is quoted here as recommended for the revision of T. R. 150-35:

Targeting the Gun.—a. Before any barrel is used for firing in the prescribed courses, it will be targeted with the gun in which it is to be used. The targeting process is for the purpose of determining the mechanical error of the gun and the particular barrel being used, and correcting for it. This error is constant at all ranges in that it causes the gun to shoot too high or too low by a constant number of mils. The zero of a gun and barrel is the sight setting required to cause the center of impact of the shot group to strike the aiming point on the target. For a normal gun and barrel (having no mechanical error) the range setting for the 1,000-inch range is four hundred and forty-one yards.

b. The procedure is as follows: The gun is loaded, the sight set at four hundred and forty-one yards (using the horizontal line opposite the peep) and the gun accurately laid on an aiming point on the target. A burst of about ten rounds is correctly fired. If the center of impact of the resulting shot group strikes the aiming point (center of the bottom of the aiming paster), no further firing is necessary except that a second burst should be fired for verification. If the center of impact does not strike the aiming point, determine, by inspection, the exact center of impact and, without moving the gun or target, change the line of aim, by raising or lowering the drift slide and by turning the windage screw to the right or left, until it is aligned with the exact center of impact. Next, loosen the rear-sight-adjusting-plate screws and move the adjusting plate until the lower edges of its two fins are opposite a sight setting of four hundred and forty-one yards.

c. To insure that the lower edges of the adjusting plate are evenly placed (if the four hundred and forty-one graduation is not on both branches of the sight leaf), the drift slide should be loosened and run up the sight leaf until a graduation is reached which has lines on both branches of the sight leaf. If the adjusting plate is evenly set, the lower edges will both coincide with the graduation lines. The rear-sight-adjusting-plate screws should then be tightened. Another burst should be fired at a new aiming point to verify the adjustment.

d. The same gun will ordinarily have a different zero for each barrel used. Once a gun and barrel have been targeted, it will not ordinarily be necessary to repeat the operation during the life of the barrel. However, the packing must be done properly, and the headspace adjustment correctly maintained, in order that the zero may not be changed. Minor repairs to the gun will not affect the zero, but major repairs, such as replacing the barrel extension or the sight or cover, will probably necessitate a retargeting.

e. Should any gun and barrel have an error in direction, this error will have been determined during the targeting process described above to determine the error in elevation. The reading of the windgauge, after the line of aim has been brought to the center of impact of the shot group as described in *b* above, is the direction zero. This correction for a direction error should be recorded by the squad leader and, therefore, in all firing with that gun and barrel, used as the direction zero."

At present, most guns do not have rear-sight leaves with the 441-yard graduation marked on them. It is now possible to have this mark placed on the sight leaves, however, and it should be done. In the meantime, the horizontal bar of the figure four (4) on the sight leaf may be used as the 441-yard index with approximate accuracy.

Ammunition. The ammunition supplied for machine gun firing is old stock and contains a large percentage of defective rounds. Many of these defective rounds can be eliminated by a careful inspection before firing.

The most important points to cover in the inspection of ammunition loaded in belts are: (1) see that the rounds are properly and evenly loaded in the belt; (2) look carefully for split cases; (3) twist each bullet to see that none are loose in the cases; (4) see that there are no bulged or dented cases; (5) see that the rims are neither too thick to work easily in the T-cut nor so thin that the T-cut will not hold the round level while it is being carried forward into the chamber; (6) see that the belt is clean and dry and that the cartridges do not stick too tightly in the belt. Careful inspection on these points will be amply repaid by a considerable reduction of stoppages.

The ammunition allowances for marksmanship have been considerably reduced of recent years. The reduction has been such that the proper allocation of ammunition to the various exercises is a vital problem, which must be solved very largely by each company commander for himself in accordance with the particular needs of the men of his company. It can be properly solved only when the solution is based upon a thorough analysis of marksmanship and an understanding of the real needs of the unit as a whole and of each individual in that unit. This problem is a comparatively new one in our service. No one has had a great amount of experience in solving it under varying circumstances, so no one person's solution can be considered best for all. However, certain general ideas may be deduced from our limited experience and from a correct analysis of the requirements of marksmanship as a step in the training of soldiers for combat efficiency.

(1) The different allowances for recruits and for qualified men are based upon correct premises. Recruits need and should have more ammunition than men who have qualified before. Under no circumstances should the entire allowances for the company be pooled and all men given the same allowance, or even approximately the same allowance. Regulations require that the allowance be used as prescribed.

(2) The allowance for unqualified men (1260 rounds) is ample (though there is no room for wastage)—if the men receive complete and thorough preparatory training. Good machine gunners are developed very largely by preparatory training, not on the range. In other words, correct technique is developed during preparatory training and is only crystallized and made habitual by the actual firing. If there is any necessity for developing skill in position, sight-setting and laying, or in manipulation of the gun during firing on the range, there has been failure in the preparatory training. Training in observation and adjustment must be given to a certain extent during actual firing but, if proper steps are taken during preparatory training, this requirement can be very much reduced. One valuable expedient which gives this training is to place the pupil at a gun which is pointed at a target one thousand inches away; have an assistant coach at the target with a device to represent shot groups; have this assistant place the device at various positions away from a scoring space and cause the pupil to estimate and announce the adjustment required to

bring the next simulated shot group to the proper point; the coach at the gun approves this estimate and causes the pupil to execute it by manipulating the gun. The manipulation may be checked, if desired, by using the sights to lay the gun on the device in its original place and then by checking the laying after the manipulation. In this way, men may be made thoroughly familiar with the essentials of observation and adjustment before going to the range.

(3) Wherever possible, men should fire the complete course as a preliminary to record firing. With the unqualified men this is possible, but the allowance for previously qualified men is too small to provide for it.

(4) The allowance for previously qualified men (seven hundred and thirty rounds) is not adequate for a complete course. As most of these men need a course which is practically complete, the real problem is here. Record requires three hundred and thirty rounds, leaving four hundred rounds for targeting the gun and for instruction and preliminary firing. This amount will fire only part of the prescribed exercises. Every man should have some practice in every phase of instruction firing, including grouping, adjustment, searching, traversing, and combined searching and traversing. He must also have some preliminary firing at each range at which he will fire for record. To neglect either is to court failure. The need for instruction firing can be reduced, but not eliminated, by intensive practice in preparatory manipulation. There are various expedients which may be used with qualified men whereby ammunition may be saved without losing the entire value of the several instruction exercises. Some of these expedients are:

Grouping practice.—This practice is important in that it teaches the proper delivery of a single burst of fire. In teaching any mechanical operation, the operation should be divided into its smallest units, each unit being taught separately and in order. Machine gun firing is a mechanical operation of which the single burst is the basic unit. The size of the burst fired in grouping may be reduced from the ten rounds prescribed to one of eight rounds, but should not be reduced below eight. The value of this exercise is largely dependent upon the burst being large enough to show a full shot group. Less than eight rounds will not always do this. With some few previously qualified men, it may be possible to reduce the number of groups from three to two. Another expedient of doubtful value, but which may be used if really excellent coaching is available, is to combine the teaching of proper grouping with another and later exercise. This should only be done by firing such a combination exercise very slowly and covering the essentials of firing each single burst separately from those of the exercise with which it is combined. This results in a very complicated exercise and leaves opportunity for neglecting some important essential; it should be used only with extreme care.

Adjustment practice.—If the training expedient mentioned above for teaching observation and adjustment is used, men come to the adjustment practice on the range needing less actual firing in order to be able to adjust their fire accurately. Proper adjustment of fire is the point at which

the average gunner fails most often. As a result of inadequate instruction, many men go to the range unable to estimate corrections accurately and then translate those estimates into mechanical manipulations of the gun with the certainty and celerity required of a good gunner. For these reasons, the adjustment practice should not be eliminated, but for previously qualified men the ammunition allowance of forty rounds (four bursts of ten rounds each) may be reduced to about twenty-four rounds which provides for either three bursts of eight rounds each or four bursts of six rounds each.

Searching practice.—This practice involves only one new element, manipulation of the elevating hand wheel, which, being purely mechanical, requires less practice than most others. If any entire exercise is to be eliminated, it would be less harmful to eliminate such a one than to leave out a traversing exercise where skill in tapping, which is hard to develop, is needed. It is believed that the searching allowance may be reduced materially with the least harm. However, such a reduction should be compensated for as much as possible by more practice in searching manipulation during preparatory training.

There are several methods of using this reduced searching allowance. One is to use it all in one exercise searching up, eliminating entirely the exercise searching down. This is probably the most common method because there are no targets in record firing which require searching down. Another method is to shorten the target space to be covered in proportion to the reduction, and either to fire both exercises or only the one searching up. Still another method is to have the gunner proceed as prescribed, but, instead of firing a burst after each two-mil manipulation, to simulate firing for a part of the time, thus getting additional practice without firing a burst into each two-inch square on the target; this can be done by firing bursts at alternate spaces, by firing at the first and last spaces only, or by adding to the latter several intermediate bursts. By using one of these expedients, it is possible to reduce the ammunition needed for searching from eighty rounds to about thirty or thirty-five rounds.

These same methods apply equally to exercises in traversing or combined searching and traversing fire. Whatever the method used, men should not be allowed to fire bursts of less than five rounds each. Effective machine gun fire in combat can be obtained only by firing long bursts so that there will be enough bullets effectively to cover the long beaten zones. The machine gun is not a sniping weapon; its major characteristic is that it delivers bursts of fire which cover areas. To use it to fire bursts of two or three rounds is to rob it of its main value, for such bursts are worthless in combat; and our ultimate mission is to develop combat efficiency.

Traversing practice.—Owing to the difficulty of developing skill in traversing the gun by tapping, such exercises require more practice than searching, and the ammunition allowances must not be reduced so radically.

Though the record course does not involve traversing to the left, gunners should be as adept in that as in traversing to the right. While most of

the practice in the left traverse must be done in the preparatory training exercises, all gunners should do some actual firing while traversing to the left. The prescribed allowance for traversing should not be reduced by more than one-half at the very most. In range firing, the most common cause of poor results is the gunner's inability to traverse so as to *distribute* the fire *uniformly* over the target. This inability is the direct result of inadequate practice in manipulation and lack of care in adjusting the traversing clamp to suit the customary tap of the gunner. Instances have been observed in which much ammunition has been used attempting to correct for such lack of preparation. Ammunition should not be used to compensate for lack of practice—there are too many other valuable uses for it.

Target D.—The prescribed machine gun target D, with its irregular figure, rarely has a counterpart in combat. It is extremely difficult to distribute the fire over it properly and the average gunner has not the ability necessary to get any value from firing it. It is believed that, in view of the reduction in ammunition, the exercise on this target does not give sufficient value to pay for the large amount of ammunition that it needs, and that it can be eliminated and the ammunition used elsewhere to better advantage.

Target E.—The reduced allowance makes it very difficult to find enough ammunition to provide sufficient practice in this exercise. It is possible, but not desirable, to use some method of distribution, such as one of those described above, in firing on target E. In view of the fact that this exercise is timed and is one of the most important in record practice, it is believed to be better to fire it once in its complete form than twice in any abbreviated form. If the exercises that precede it have all been taught thoroughly and well, one preliminary exercise on target E will be sufficient for experienced men. A valuable training expedient, if sufficient equipment is available, is to have an extra gun at each firing point and give every man a "dry run" for one order before actually firing.

Field range preliminary.—If men have been allowed the amounts of ammunition for instruction firing and one exercise on target E which have been suggested above, they will have expended two hundred and eighty-five of their four hundred rounds (including five rounds for targeting). The remaining one hundred and fifteen rounds must be used for preliminary firing on the field range. If this amount is used to the best advantage, the full allowance (sixty rounds) will be given to the traversing exercise at six hundred yards and the remainder divided between the three fixed-fire targets about as follows: six hundred yards, twelve rounds; seven and eight hundred yards, twenty-eight yards; and one thousand yards, fifteen rounds. The time limits of the last named three exercises should be reduced proportionately.

In solving this reduced allowance problem, some officers have advanced the suggestion that, for previously qualified men, instruction firing on targets A, B, and C (grouping, adjusting, searching, and traversing) be eliminated entirely and range firing be limited to target E and the field range. It is believed that this solution would

only very seldom be best. In most units men do very little if any firing between marksmanship seasons. Without constant practice men cannot carry over from year to year their skill in the detailed operations of firing. Instruction in the details of firing is necessary except in those rare instances in which certain men do considerable firing throughout the interval between marksmanship seasons. The idea that, just because a man has fired excellently one year, he will not need detailed practice the next year, is fallacious. In proof of which the following is cited. At the Infantry School is a group of noncommissioned officers who are assistant machine gun instructors; among them are some of the best gunners in the army. These men actually fire the course every year; they assist in the instruction of several classes in marksmanship every year; they each fire thousands of rounds annually in demonstrations, not only of marksmanship but of direct laying, indirect laying, combat practice, and antiaircraft firing problems, in which results must be accurate; they target guns frequently and do considerable test firing of various kinds. They do many times as much firing as the average man in the service and they know their subject thoroughly. Yet, if they are to demonstrate even so simple a thing as traversing a short target, they find it necessary to practice traversing a bit before being sure of the results that they will get. If that is true of these men, how much more necessary is it for the average soldier to have long and careful training before firing record.

Targets. 1,000-inch.—The various targets for the 1,000-inch range firing are for the purpose of teaching specific and necessary lessons in progressive sequence. They are based upon the well demonstrated principle, mentioned above, that a mechanical subject can be taught best by dividing the subject into its basic operations, teaching each of these thoroughly, and providing that each successive exercise include those previously covered. With the exception of machine gun target D, the prescribed targets provide an instruction course which gives this sort of training; no element can be omitted if the training is to be thorough; there are no superfluous exercises.

While these targets have been prescribed for several years, they have never been issued in the prescribed form, for the enormous supply of old machine gun targets Number 1, printed during the war, and could not be wasted. The new targets might have been printed on the old ones before issue, but this was never done and they have had to be made locally. To make them by hand is a very tedious undertaking, and few posts are equipped to have them printed. This difficulty has undoubtedly led to considerable carelessness in their making. There is more than a suspicion that many officers have neglected to provide all of them for their units with the inevitable result that their men have been inadequately trained.[2] In the making of these targets, it is best to place the scoring spaces on the blank side of the old targets. The lines on the face interfere with observation and serve no useful purpose except to assist in estimating corrections, something which is not at all necessary.

Successful firing on the 1,000-inch

[2] The Infantry Association is prepared to make plates for and print these targets accurately and at reasonable cost.

range is absolutely dependent upon the gunner being able to see his shot groups as they form. Observation is indispensible and any expedient which will insure it is justified. The best observation is obtained when the sun is shining on the rear of the targets. Good observation can be obtained when the sun is shining on the face of the targets, by placing a blank target behind the target to be fired upon at such an angle that it will reflect the light through the bullet holes. If the sky is overcast, the best method is to take extra targets and fasten them against the back of the targets to be fired upon, thus shutting out all light and causing the shot groups to look black.

Field range targets.—In general, the targets used on the field range should be such as will carry the purely mechanical lessons learned on the 1,000-inch range one step nearer actual combat conditions. However, this step should be confined to the greater range and to the changed aspect of the cone of fire falling on a horizontal surface instead of being intercepted by a vertical target; it should *not include* the element of lowered visibility which is introduced if the targets are other than clearly visible. The targets should be such as will permit scoring results in direct proportion to the degree of skill demonstrated in engaging them; there should be no element of luck or chance in the fire effect; they should be of such a nature as to present a test of the gunner's efficiency in all kinds of fire, the kinds of fire to be required in proportion to their combat importance. For instance, the present course includes tasks in fixed fire out of all proportion to the importance of fixed fire in combat, while it has only one task in traversing fire, none in combined searching and traversing, and none in traversing to the left. It is unfortunate, but the course cannot be changed to include the classes of fire in their correct proportion so long as the ammunition allowances remain small, nor so long as many units are stationed where ample range space is unavailable.

The principal defect of the present course as a test of individual ability lies in the 600-yard traversing target in that the ten E-silhouettes that make up that target do not always register results in direct proportion to the skill of the gunner. Bullets which go between the figures are as valuable for the purpose of denying an area to the enemy as those which hit figures; a slight error in manipulation at the beginning of an exercise, which is thereafter manipulated correctly, will often produce a far poorer score than another exercise fired with several errors, for the reason that, in the first instance, many of the bursts will pass between the figure (especially if the observation of the strike is not good). The use of silhouettes which simulate combat targets introduces the element of lowered visibility, therefore it has been recommended that this target be changed to a solid screen target.

Regulations prescribe that the present targets must be used as issued; they must not be painted, nor may any device such as a special background be used to increase their natural visibility. This does not and should not preclude turning the side of the target (the white or the green) which will be the most visible toward the gunner. The gunner is entitled to see his target clearly and any regulation or custom

which denies him this is contrary to the basic object of marksmanship training.

Ranges. The requirements of a good field range are such that many units are seriously handicapped in their training, and this will obtain as long as they are kept where proper terrain is not available. The guns should have enough command over the target area so that the gunner can see the entire beaten zone of his fire; for only by seeing clearly can a gunner know how to control his fire and thereby learn marksmanship. The ground should be level or uniformly sloping for some distance around the targets, so that adjustments can be determined accurately. Under no circumstances should the targets be placed upon parapets; the object of the fire is to place the center of impact exactly on the target and this cannot be done if the beaten zone is not seen in correct relation to the target. The parapet hides that part of the beaten zone which falls behind the target. Units that have to fire on rifle ranges that have parapets, or on ranges that have not the command and level areas mentioned above, are tremendously handicapped.

A further characteristic of ranges which has a considerable influence is the surface soil. Good observation cannot be had if the surface around the targets is wet or covered with heavy vegetation. Light, sandy soil with no more than sparse vegetation is best. If the soil is not of this kind it should be plowed both in front and in rear of the targets to insure that the strike of the whole beaten zone may be seen. If the surface does not give good observation and is such that it cannot be plowed, it should be covered with a soil of a fine texture around the targets. Rocks and stones which tend to increase ricochets should be removed or covered.

TRAINING

The question of training presents a subject upon which volumes could be written were it possible to discuss fully each step or phase or exercise involved. Such a discussion is impossible here and is unnecessary; there is a training regulation which covers the subject and which is available to everyone. Attention is invited to the very pertinent article, "Fast Shooting," by Capt. C. R. Sargent, in the June INFANTRY JOURNAL.[3] If the regulations are studied thoroughly enough to isolate and understand the principles which underlie the methods described, then there will not be so much difference of opinion about the proper methods to employ or about the necessity for the various exercises. Furthermore, it would be possible for the individual to vary some method of training to suit local conditions or his own preference, without violating a necessary principle.

The revision of T. R. 150-35, now under way, contains many changes in the methods of doing things, but the basic principles remain the same. The new method of targeting described above follows the same principles but gives better results in less time, with less inconvenience, and at a smaller expenditure of ammunition. Changes in procedure of this kind, if they accomplish the real object, are usually perfectly all right. Another change worthy of mention here—in that it can be

[3] Page 598, INFANTRY JOURNAL for June, 1929.

used at once—is in the new position at the gun, which is described as follows:

(1) The gunner sits in rear of the trail shoe, straddling the trail, with the feet under the tripod; (2) the knees are drawn up and turned out and the elbows are supported on the inner surfaces of the thighs; (3) the thumb of either hand is placed in rear of the stock and the forefinger on the trigger, the remaining fingers not touching the gun; (4) the other hand is held opposite the side plate, ready to tap; (5) the head is erect and the eyes directed toward the target.

The change is in the hold on the gun. The thumb and forefinger alone touch the gun and the trigger is pressed by a pinching motion of the two. This position insures that the hold taken on the gun will not affect the laying, and so insures better shooting; it facilitates manipulation by leaving one hand free while the other is firing; it shortens the time required to teach the position and lessens the necessity for grouping practice, by making it easier to deliver correct groups.

Record Firing.—Record firing brings into play more reasons for differences in results than any other single division of our subject.

Different interpretations of the rules that govern record set up widely different handicaps; different officers, in their zeal for high scores, evolve or permit practices which assist the gunner materially, and which may or may not violate the letter of the regulations but which do deny the ultimate object of training and therefore violate the spirit of the rules; officers have allowed improper practices through unfamiliarity with the rules, and for various other reasons. It is practically impossible to write regulations that cannot be misinterpreted if the motive behind the interpretation seeks an advantage. While there is some room for improvement in the present regulations in this respect, no amount of improvement will insure correct interpretation unless the officers themselves read the regulations in the spirit in which they are written and with the proper motive behind their reading. There are three elements to the correct motive for making an interpretation, which are, giving the man a fair chance, safeguarding the interests of the government, and developing real combat efficiency.

It is a widely held opinion that the old regulation, now rescinded, which required officers to qualify eighty per cent of their men on pain of having to explain why they should not be considered as deficient, forced upon officers a further motive which, in the light of the uncertainty as to what actually could be done, compelled them, in self interest, to make every possible interpretation in favor of the man. Whether or not this opinion was justified, it is believed that it was the real genesis of many of the improper practices of which so much is heard. Although this requirement has been rescinded, we have inherited the conditions to which it gave rise, and it will take some time to get rid of them. It is also believed that the attendant over-emphasis on marksmanship has given many officers the idea that marksmanship, in itself, is the final aim of training when, in fact, it is only one step in preparation for combat.

Machine gun marksmanship, unlike rifle marksmanship, is a new subject in our service. Its growth has been too short for it to have developed a full

and effective set of safeguards against illegal practices. However, the time to eradicate these practices is now. There is no question about their presence—the first thing to do is to recognize them for what they are. There is not space here to mention all of them, but a few will be set down, together with comments which may indicate the proper light in which to view others.

1. A number of men fire the same gun. One practice has been to have the best gunner in each group fire the first order in each exercise, determine the correct sight setting for elevation, note the elevating dial setting and pass this setting on to the next gunner. The second gunner goes to the gun and, although the gun is laid off of the target, his task of laying for elevation is simply to turn the elevating handwheel to the announced setting; he then checks the direction and commences firing. He gets no practice in accurate laying, which is an important element; he is riding on the ability of another man and, although he hits the target, his score is not a true measure of his ability. Is this preparing the man for combat? The new regulations will definitely prevent this practice, but a prohibition would not be necessary if an officer who permitted it had made his interpretation of the regulations in the proper spirit.

2. Using a zero sight setting in firing on target E and aiming at the scoring spaces instead of at the aiming pasters would be wrong. One of the elements of this exercise is the changing of the sights for each target; the above wrong practice does away with the changing of the sights, robs the man of essential training, gives him an unfair advantage and fails to promote the skill intended to result. This practice is definitely prohibited by regulations.

3. The officer in charge of firing is required to count the ammunition in the belt before each exercise and to insure that only the authorized amount is at the gun. This has not always been done; and when men know that it is not, improper amounts will be brought up and fired. An officer who allows this and then signs the required certificate is making a false statement.

4. It is required that, before each exercise, the officer in charge of firing personally lay the gun off of the correct aiming point a minimum of five mils in both elevation and direction and that, thereafter, no one move the gun or look through the sights until after the command to commence firing. This is to give practice and insure skill in rapid, accurate laying. If it is not done, or if the gunner is allowed to know the amount and direction the gun is laid off, the required skill is not developed and the gunner is given an unfair advantage.

5. After the gunner goes to the gun, it is prohibited that he be coached in any manner. Coaching includes anything which will assist the gunner in engaging the target effectively. Opportunities for illegal coaching are numerous and violations must be watched for continually. The revision of T. R. 150-35 provides that the gunner will be alone at the gun, a Number 2 not being allowed. The alert officer can prevent illegal coaching if he really desires to.

6. It is required that officers who are scoring targets personally count and supervise the pasting of all bullet holes. Scoring is a hard task at best, and carelessness in supervising the

pasting often develops and gives opportunity for some bullet holes to be left unpasted, through design or neglect. This is a popular method of doctoring scores when the chance is given. To prevent it is squarely up to the officer concerned.

7. It is prescribed that only bullet holes be counted, disregarding holes made by stones. The tendency is to count all holes, on the assumption that they might have been made by bullets. There is no difficulty in distinguishing between holes made by bullets (except a very few ricochets) and those made by stones—if there is a real desire to be accurate. To obviate even this small chance of error, the new regulations probably will prescribe that ricochet hits be not counted. Ricochet hits have some value in combat, but, after all, a hit by one is not a measure of accuracy. As mentioned above, the surface around the targets should be cleared of rocks and stones or, if that is impracticable, they should be covered. To neglect to do one or the other is to court ricochets in favor of better scores. It has even been hinted that some ranges have had loose stones or gravel placed on them for the purpose of getting lots of ricochets which could be counted. It is difficult to believe that any officer would countenance such a flagrantly dishonest measure.

8. In some instances men have been taught to use very small bursts in order to minimize vibration, keep the cone small, and thus make it possible for a maximum number of the bullets to strike the target. Such a procedure may produce a few more hits on some targets, but it violates the fundamental characteristic of machine gun fire. The object in combat is to fire a burst of enough rounds to cover the whole beaten zone, which requires long bursts. Marksmanship is a step in training that is pointed toward effective combat fire. Bursts of two or three rounds the practically worthless in combat, so that they should not be allowed in marksmanship. Bursts of five and six rounds as required now are really too small but, due to ammunition restrictions, they are used as a compromise.

9. It is required that officers in charge of firing and those who are scoring sign a certificate that they are familiar with T. R. 150-35 and that its requirements have been complied with. Many officers detailed from other than machine gun units are not familiar with the requirements, sometimes from lack of opportunity and sometimes from carelessness; such officers unknowingly fail to perform their duties properly, or allow improper practices. The only solution is to insure that all such officers actually know the requirements before taking up the duties. A moderate amount of instruction would suffice, but it is seldom given.

There are other illegal practices and also other points which require interpretation or special action. To decide rightly as to any of them, keep in mind the ultimate mission and the basic elements of marksmanship, then consider that the man should have a fair chance, that the government's interests should be safeguarded, and that the combat efficiency of the men and the unit must be developed. This done, the proper decision should be clear.

Reserve officer in their locality, call on

Duty With the Reserve Corps

STAFF SGT. PHILIP SIMCIC, D. E. M. L. (O. R.)

Sergeant Simcic has been on duty with the Organized Reserves for more than five years. The following paper sets down the results of a considerable period of intelligent observation.—EDITOR.

THE Organized Reserve is one of the most important components of the Army of the United States. Yet it appears that, in time of peace, it is the one that is least considered by the American public.

Because of this lack of active consideration the Reserve Corps contains many officers who have been unjustly called "deadwood," meaning that they have shown no interest in their commissions or what these represent.

During the past year the War Department has issued regulations calculated to eliminate the "deadwood." It has instructed Regular personnel to inform the Reserves of these changes. A great many Reserve officers received this information, but many also did not and many do not yet understand the changes. As a consequence many worthy Reserve officers have been placed on the "'ineffective list"; and, even worse, the best among these officers have refused to accept reappointment on this list. Thus many good officers and much good material have been lost to the Reserve Corps. They will probably never return, since they feel that they did not receive just treatment.

Let us see whether or not they were right.

During the time in which we first began to hear the term "deadwood," Reserve officers were being placed in sections for which they were not fitted and in which they had no interest. A number of such officers failed to receive satisfactory replies to their correspondence. What was more natural than that they should lose interest? And many a Reserve officer today still lacks and cannot get information about his status, or the regulations—through no special fault of his own.

Here then we have something on which to work. The Regular personnel must find some way of increasing interest and activity among Reserve officers. Every Regular on duty with the Reserves should know thoroughly all regulations and orders that affect the Reserve Corps. He should use every opportunity to bring to the attention of Reserve officers anything that might be of value to them; and every officer on duty with any part of a civilian component, regardless of his primary assignment, should cooperate in every way possible with the local units or members of the Reserve Corps.

In setting forth their ideas there is no intention of reflecting on the many Regulars who do help the Reserve Corps. But many, not interested, fail to take part in Reserve matters. Perhaps if orders required all officers on duty with civilian components to take an interest in Reserve matters, and called for reports on how well they complied with these orders, this particular situation would be improved. Regular personnel on duty with the Reserve Corps should make it their business to become acquainted with every

Reserve officer in their locality, call on each personally, talk Reserve matters over with him, show him the importance of the Corps and necessity of his taking as active an interest as business permits, explain the War Department requirements and how they affect him individually, and become identified with as many civic movements as possible and so create opportunities for spreading information about the Reserves. The Regular officer should be interested in the Reserve officer and his attitude toward the National Defense, and should make this plain.

Regular enlisted men on duty with the Organized Reserves should be letter perfect in the regulations. They should learn the status of each Reserve officer with whom they have to deal, and of all others in the locality. They should establish friendly relations with all officers. They should be careful to learn and remember the name, rank, and branch of every Reserve officer—in fact, they should know the Reserve officers as a first sergeant knows the members of his company.

Here is a list that might well be a specific guide for Regular personnel on duty with Organized Reserves:

1. Become "sold" on the Reserve component of our Army.

2. Take every opportunity to show officers the importance of their positions in the scheme of National Defense.

3. Keep tab on officers who are taking correspondence courses. Find out what they think of them, how they are getting along, and give them every possible assistance.

4. If an officer is due for promotion, make application for him for the necessary examination or certificate of capacity.

5. Have a good basic knowledge of all branches, so that you will be able to help any Reserve officer who may ask for information.

6. Never tell a Reserve officer that he should make an application for this, or write about that—do it for him yourself.

7. Keep in mind that most Reserve officers do not remember all of the details of the military service that apply to the Reserve Corps. Handle as much as you can for them.

8. Forget office hours. When a Reserve officer wants something, do it for him regardless of the time of the day or the day of the week. Remember that he has a business and that much of Reserve work must be done outside of the usual office hours.

9. When an officer asks you for information give it to him or get it for him. Do not tell him that he can get it somewhere else.

10. Always answer correspondence from a Reserve officer promptly. If you can't immediately give him the information that he wants, write him and tell him so, and let him know when you will furnish it.

11. Avoid sending letters to an individual on matters that do not especially concern him. Unnecessary circularization tends to make Reserve officers consider military correspondence as so much advertising matter. As a consequence they sometimes fail to take care of important correspondence.

12. Above all, never let personal opinions or likes or dislikes affect your work with any individual or group of Reserve officers.

If you observe all of these things you will probably bring back to life much "deadwood."

The Atlanta Campaign

Its political background and effect

MAJ. DONALD BRIDGMAN SANGER, Signal Corps

THE winter of 1863-1864 may be said to have been the dark days for the Lincoln government. In spite of the happy ending to the Gettysburg campaign, the political results were of a negative rather than positive value to the President. The elections of 1863 had turned against him, and there was every evidence that the drift was sufficient to prevent his renomination at the spring convention. In the South, the political situation was not much happier. The Chickamauga campaign had been unproductive; it was as negative in its result to the South as Gettysburg had been to the North. And there was a similar drift away from President Davis that sapped the strength of his administration.

Both sides were wearied of the struggle, and the realization grew that there could be but one more effort. The end was near. It was evident to President Lincoln that the northern strategy must be one of combining military success with political victory at the coming national elections. In no other way could the Union be saved.

It was equally evident to President Davis that the most effective strategy for the South lay in aiding the peace party of the North in its campaign to take over the government. With Lincoln defeated, the South could win. Having already lost her chance to win by force of arms at Stone's River, this, with the loss of foreign support occasioned by the fruitless Gettysburg venture, left the South with but the single hope of gaining a stalemate through the political defeat of the war party of the North. In this she had made admirable progress, and the way brightened increasingly for the already disintegrating southern confederacy. Could they but stave off defeat in the field, and hold together for this last defensive effort, the Confederate States of America could expect to enter upon a treaty of amity and friendship with her sister of the North.

After Chattanooga, the logical program was a thrust into the vitals of the Confederacy. Some such plan had appeared probable from the time of Halleck's control in the west, but the earlier political problem of the border states had prevented a wholesome view of military necessities. When Grant came to power, the military received its due consideration for the first time. The coming campaign of the west was to be a part of Grant's "common sense" plan for winning the war. The genesis of the Atlanta movement therefore seems to lie in the appointment of Grant as a lieutenant general and his assumption of the supreme command in the field.

Grant's plan lay in the simultaneous advance of three armies. Sherman was to pierce the heart of the South and lay waste the country; Butler was to advance up the James and demonstrate against Richmond; while Grant, with the Army of the Potomac, was to close with Lee's army and worry it to death. These plans were essentially those of General Grant. For the first time Lincoln was able to subordinate

himself to his generals on matters strictly military.

But back of this simple explanation of the concerted movement which was to destroy the Confederacy, lay a bewildering political situation, and as each element is exposed to view, it will be seen that two democrats—Grant and Sherman—play a chief part in assuring the success of the Republican party. Should the campaigns of 1864 fail, then two great nations instead of one would occupy the territory of the old Union. And it was the western part of this concerted movement that insured the defeat of the Confederate strategy.

I.

Lincoln's greatest problem, after the fall elections of 1863 had indicated the popular sentiment, lay in securing his own return to office. The election of any other candidate would split the Union beyond recovery. To win the elections and thus guarantee the continuation of the Lincoln policies demanded that the war be so conducted as to bring one or more positive victories in the field. It also required that the scattering fragments of the pro-Union political forces be brought together under some dominating leadership. It was time for Lincoln to quit playing the general and to give some thought to the game he knew best how to play—practical politics. He had three distinct things to accomplish in order to win.

First, he must have a general. Casting his eye over the field, he saw little from which to choose. One by one his republican generals had failed; the greatest of his democratic failures, George B. McClellan, had now become the idol of the democrats and was certain to be his opponent in the November elections. The curt telegram which had relieved McClellan after Antietam was not to be so easily lived down. Butler was left—that brazen and thoroughly unscrupulous Massachusetts politician Sherman was available, and Meade, and Grant. Butler would not do for obvious reasons, and Meade had lost the confidence of the politicians by his inability to destroy Lee after Gettysburg. Sherman was the brother of John Sherman, and John Sherman's brother could not hope to win the support of the country. Grant was available. Grant had won battles. But here was Lincoln's dilemma—without a victory he would be lost at the polls; and with a victory, he might lose at the polls to the man who would rise to prominence over the torn fields of battle. What Lincoln needed was a fighting general—one who could win a victory—but that victory when won must become the sum total of a general's ambition.

While Lincoln pondered this matter, the New York *Herald* came forth with the gratuitous information that Grant was the logical candidate for the presidency.

Lincoln first looked toward the west, but the vision came to view of Rosecrans surrounded by politicians who were all dickering with that unfortunate commander. This would not do. Lincoln next sent Thurlow Weed—of the old political firm of Seward, Weed and Greeley—to sound out McClellan to see if he would assume command of the Union armies—with the proviso, of course, that he would not capitalize on any victories and look longingly at the White House. McClellan would have

none of it; and his answer was even more caustic when a second visit was made by Francis P. Blair, Sr., who had picked up the burden laid down by Weed. Having tried twice to command an army under the President with humiliating results, the "Little Napoleon" had no stomach for further trials. The telegram of November 7, 1862, still rankled. So Lincoln turned west again.

In the early part of January, 1864, Secretary Stanton was rushed by special train to Louisville for the purpose of sounding out Grant. Grant was late for his appointment with his chief, which sent Stanton fuming back to Lincoln with an adverse report. Grant would never do. But Lincoln pondered: he *must* have a general.

Grant was a democrat; he might beat Lee—and he might also beat Lincoln in November. The President was in a quandary until J. Russell Jones, of Chicago, brought Lincoln a letter from Grant which gave the information that the politicians were a nuisance—just pestering nuisances—and that all that Grant wished was to be let alone. Lincoln was delighted. Here was just the general he needed: a fighter and one who held no thought of political advancement. Grant was summoned to Washington to receive the plaudits of Congress and his commission as lieutenant general. The first part of Lincoln's program was accomplished—he had secured his general.

During the early winter it had become increasingly evident that the defections from the President were to rob the Republican party of its narrow margin for success in the next elections. A Democratic victory was certain unless some new source for Lincoln votes could be discovered. One hope lay in securing the votes of the war or union Democrats—that group which had followed the remarkable Stephen A. Douglas to defeat four years before. With the death of Douglas, this faithful group had been without a leader. How to gain their votes was another problem.

Hannibal Hamlin had made a satisfactory vice-president, but he lacked that essential magnetism that betokens the true political leader. A native of Maine, converted to Democracy but a short time before, he was not the man to win over the border states or the disgruntled war Democrats of the northwest. As the drift of the sentiment became clear, Lincoln did not hesitate. Hamlin was cut loose from the ticket. He never knew until years afterward how it all happened. Some new running mate for the President must be secured who could win the votes of the war Democrats and still hold the military groups. The East was gone beyond recapture; the hope of a Lincoln victory now lay in securing the middle class democratic vote of the west.

Butler was considered as a replacement for Hamlin, but the choice of Butler would antagonize the pro-slavery groups. Furthermore, it was doubtful whether Butler could have secured much more than the Abolition wing of the eastern Republicans. The choice, however, centered tentatively on Governor Johnson of Tenneseee sometime before the movement of Sherman's Army on May 3.

Johnson was disliked; Johnson was hated by the aristocrats; but Johnson had nerve and a bountiful love for the old Union. He had evidenced his worth during those strenuous days of 1863 when he was military governor. There were disturbing reports that he

was carrying things with too high a hand; that the people were beginning to turn from him. Before the choice was made definitely and his name submitted to those who were to dictate the nomination, Lincoln sent Gen. Daniel E. Sickles to Tennessee for the purpose of checking up on just what Johnson had done. Sickles's report was made favorable, and Andrew Johnson became the Presidential choice for the office of vice-president. This brought to Lincoln the support of the Union Democrats and the middle class groups of the west who were anti-Vallandigham. Lincoln's second problem was solved.

The third problem was not so easy.

It may be noted in passing that the extent that General Sherman was taken into the confidence of the President may never be known. It is certain that General Sickles informed him of at least part of the political program, as Sherman issued an order on May 2, calling upon all officers in authority to give General Sickles such "information as he may require in the execution of his office." There is no doubt that General Sickles was on a political mission within the limits of Sherman's command; and, knowing Sherman's aversion to politicians, one must come to the suspicion that this doughty campaigner had more than one message from the President before he gave such freedom to a volunteer general to visit any and all parts of his command on the eve of a vital campaign. This is brought out further by the fact that on May 5 Sherman refused positively to change one of his orders at the request of the President. He says: "I will not change my order, and I beg of you to be satisfied that the clamor is partly humbug, and for effect." Again politics. Had Lincoln anticipated that the name of William T. Sherman would have come up for the Democratic candidacy at Chicago, would he so far have trusted him? But Lincoln knew his man.

The third part of Lincoln's problem was to secure the necessary number of delegates at the Baltimore convention to secure his renomination. The defections were damaging. Already Chase of Ohio and Trumbull of Illinois had crossed over; Henry Winter Davis —the man who had saved Maryland to the Union—; Whitelaw Reid and Edgar Conkling of Ohio, and the Honorable Benjamin F. Wade—the man who saw visions of the presidency provided the impeachment of Andrew Johnson were successful—; Chandler of Michigan, Governor Yates of Illinois, Horace Greeley, Amasa Walker, and scores of others who had been strong for Lincoln in the earlier days, were now opposing him openly and working against him in secret. And Senator Sumner and Thaddeus Stevens threw themselves into the fight. Those were the days of dirty politics and one could count little on the political loyalty of his fellows. The stage was set for a political revulsion against the Lincoln administration which was to cast him from office and consign him to political death.

The problem of securing delegates became pressing long before the convention materialized. The defeats at the 1862 elections had brought to Lincoln the disturbing news that he could count on but few of the northern states. To meet this loss, he had arranged to set up temporary governments in Louisiana, Arkansas, Florida, North Carolina, Tennessee, and Kentucky. These were the famous "ten per cent" states—those state govern-

ments in which ten per cent of the voters in the national elections of 1861 had taken the oath of fidelity to the Government and the Union, had been authorized to establish new governments. It goes without saying that these newly formed state political organizations were safely Lincoln before they had been recognized.

Sensing the desperate attempts that would be made to get at the soldier vote, the circulation of Democratic campaign literature in the armies was prohibited, and, at the same time (in some cases), the soldiers were paraded and exhorted to vote for Lincoln and thus save the Union. Burnside had incurred the wrath of the politicians by his arbitrary stoppage of the anti-Lincoln press in 1863, and the aftermath was most unfavorable to the administration. This action crystallized the resistance to the draft in some sections, and created a political disturbance productive of extraordinary results. During this period President Lincoln was forced to play rare politics, realizing full well that the final success of the Union armies depended on a public endorsement of the administration. If Lincoln went down to defeat, the war was lost.

In all this political activity it must not be supposed that the President was actuated by selfish motives. It is more probable that Lincoln saw only too clearly that apathy toward the war which was a most effective ally for the South, and which would rise up to defeat the purpose of the war if it were allowed to fasten itself to the people. Lincoln had that rare gift which combined political sense with a consummate statesmanship. No other public man of his day was so blessed. He had blundered—yes—but these blunders had intensified the determination to succeed. The times required a master politician, and there was one in the White House.

II.

Having been awakened by the stunning blow of Lee's second defeat in the North, the Confederacy was face to face with ultimate collapse. Her only chance lay in a cessation of the war by popular demand. Sensing the drift in the North, every effort was made to stimulate and encourage the peace party. Political advisers were sent to Canada where, from a point opposite Ohio, the Vallandigham campaign was managed. The South saw hope in the swelling ranks of the Order of the American Knights, and its kindred society, the Sons of Liberty. By the spring of 1864, these organizations were exploiting their partial victories of 1863. They were fast becoming a political weapon of damaging proportions, as well as an annoying obstruction to the orderly prosecution of the war. The influence of these societies had served to discredit Lincoln in his own state, and although the set-back that Vallandigham suffered in Ohio had been overwhelming, he was again coming to favor. But McClellan was the idol, and his forces were gathering in such numbers as to insure his nomination.

All this brought comfort to the South. Conditions, however, had gone from bad to worse. Money was already unbelievably inflated—it took twenty paper dollars to equal one of gold—and the small amount of specie had long since disappeared from circulation. So desperate were conditions that General Longstreet proposed in his blunt fashion to send troops about

the country for the purpose of securing all gold and put it to use in the purchase of needful supplies. General Lee had a hard time dissuading his old warhorse from this scheme.

The supply system had broken down, which forced the armies of the northeast to adopt a severely restricted ration. Meat was available for two days a week, and tea or coffee were almost unobtainable. Many troops were detached from commands in the field and sent into the deep South on a mission of locating and requisitioning supplies. Munitions were scarce even though the French were aiding the passage of arms through Mexico and thence over the wastes of Texas to the seat of war. Even the blockage was effective, and the careers of the blockade runners carried an ever increasing spice of danger. Some cotton was being shipped, but only on condition that half the tonnage be for the credit of the government. This was not at all pleasing to the cotton merchants who, seeing the inevitable, were attempting to cash in on their holdings.

The political defections in the South were even more disturbing to President Davis than were those of the North to Lincoln. Alexander H. Stephens, the Confederate vice-president, had fallen into disfavor, and was at least friendly to that Georgia group under Governor Brown which attacked Davis most bitterly. Nearer home, the shafts of opposition came from the virile Daniels of the *Richmond Examiner*, and W. W. Holden, one of the prominent editors of the Carolinas. Even Yancey—the man who had cried aloud for disunion and for the establishment of a Confederacy where every White should own a Black—had swung in opposition to his former colleague, and had left a doubtful heritage when he departed this world.

To meet this political disintegration, President Davis lacked that peculiar political judgment and ability that characterized the northern president. He was, in truth, no politician; he was a statesman. What the Confederacy needed—and badly—was a master politician.

The conscription law had proved a political boomerang. Instant opposition had registered in the mountain country and throughout those sections that had never been whole-hearted in support of secession. Many took to the hills or swamps, and hundreds gathered together in small bands and openly defied the government. Some went so far as to terrorize communities and became nothing less than outlaws.

To render inoperative the conscription law, justices of the superior courts of both North Carolina and Georgia made use of writs of habeas corpus which thinned the ranks immediately before battle. And, in Georgia, the governor declined to use the militia for anything except the defense of the state. Verily, the South was hoist on its own petard of states rights!

The personal animosities created by the partisanship shown a few officers by the War Department now bore bitter fruit in that the quarrels entered the field of civil politics. Lee was respected and given wholesome support, but many of the other generals had good cause for complaint. Joseph E. Johnston had developed a most irritable "grouch" after First Bull Run, and it had never left him. In fact his feeling of bitterness toward Jefferson Davis had been augmented by the criticisms directed at him for the failure to stop Grant at Vicksburg. Beau-

regard was on the outs with the government, and Floyd of Virginia was caustic in his denunciation of the President. All this added to the burden of the already perplexed president. The prevailing complaint was that the favored places were all given to Virginians—which was not true—and it was widespread enough to eat the heart of loyalty from many of the higher commanders. Bragg had failed in the west, and there was great disappointment that Longstreet had been so unsuccessful in turning Chickamauga into something more than another Gettysburg.

In the Confederate senate was a large group that had never been completely secession in sentiment. Graham, Hunter, John B. Floyd—all opposed to Davis and the administration policies—united with the faction led by Henry A. Wise of Virginia in a deliberate attack to discredit Davis. Alexander H. Stephens was working under cover to stop the war. And when the president appeared before the senate to suggest emancipation as a final concession to obtain foreign recognition, Senator Hunter rose in his place and demanded: "What did we go to war for?"

In North Carolina the situation was full of trouble. Governor Vance had been elected in 1862 on a states' rights ticket; was opposed to the war, and quarreled with Davis continually over the matter of precedence. Vance insisted on being first, and forced Davis into an inferior position when the latter visited the state. His reception was most humiliating. Taxes were high, and North Carolina resisted from the start both the draft and high taxation. And it was Justice Pierce of the state superior court who stated that the writ of habeas corpus should issue to any soldier who wished to beat the draft. In this stand he was supported by W. W. Holden who used his editorial page to attack Davis and his "encroachments." Before the dawn of a new spring, the city of Greensboro was the scene of an anti-Davis riot. So much for North Carolina.

Georgia was not far behind her sister state in being a malcontent. Governor Brown, who had been elected for a second term in 1863 on a ticket which opposed Davis and his war policies, now led the growing peace movement which is said to have been the child of Vice-President Stephens. Brown was always pro-secession, while Stephens had been in opposition. Neither Brown nor Stephens were strongly pro-slavery. Robert Toombs, the third member of the group, planned with Stephens to call a convention and force the president to stop the war with the best terms obtainable. It was at this time that Mr. Stephens entered into correspondence with General Sherman, seeking some avenue of approach to an armistice. But Lincoln said: "Be cautious!," and Sherman had nothing more to do with the project. The plans fell through, but not until about one-third of the State of Georgia was committed to peace and the overthrow of the Confederate president.

Governor Brown has the additional distinction of having been the cause of the removal of General Johnston and the substitution of the incautious Hood. The weakness of the president in this one case alone was largely responsible for the final collapse of the Confederacy.

There is no doubt that the South was slipping from the president during

the winter of 1863-1864. Such a thing as national support had disappeared. Loyalty was becoming a local or community thing, with each state supreme unto itself. To show the tenor of the bickering, witness the letter to the Confederate war department from Governor Vance complaining of the expertness of the foraging parties of Southern cavalry. His words are classical: "If God Almighty had yet in store another plague worse than all others which he intended to have let loose on the Egyptians in case Pharaoh still hardened his heart, I am sure it must have been a regiment or so of half-armed, half-disciplined Confederate cavalry."

By the spring of 1864 the Southern national debt had reached the proportions of almost a billion and a quarter in gold, and the state and municipal debt must have been at least an equal amount. The Confederacy was in debt beyond all hope of redemption—even if successful—and the tax burden caused groans to issue from a people who had never before known the burden of a high tax. The rise in price of staples was such that the wages of a soldier were not sufficient to buy a single bushel of wheat per month.

The method of tax payment was modified early in 1864 so that taxes could be paid in corn, bacon or wheat, and not in paper money. Nobody would accept the paper money at face value under any circumstances. An additional tax was laid on the farmer of one-tenth of all that was planted; to be supplied in kind. This one tax or levy on food stuffs should have supported the armies, but the complete breakdown of the railways prevented physical supply. It was a most trying situation; and it was made worse by the attitude of some states who interposed the academic question of states' rights in times of national peril.

The president had but one course to follow: to present a united front to his enemies and stave off any decisive victory for his opponents. Could he but hold his enemies at bay until after the elections in the North, the South could go her way unopposed. It was to this purpose that General Lee was to wage his brilliant campaigns, and that Johnston was to parry each blow that Sherman aimed at him. Had the president kept his real purpose in mind and paid less attention to the snarls of his political enemies, the war might have been won. But a word or two of the foreign situation.

III.

The situation abroad was less hopeful for the South than it had been at any time before the Gettysburg campaign. All chance for British intervention was gone, and the negotiations with Napoleon were still unfruitful. The able articles of Robert J. Walker—the tariff expert, it will be remembered—were rapidly undermining the last vestige of Confederate credit among London banking circles. Yancey was dead; but his failures in London lived after him to torment the Richmond government. The Confederacy had one friend, W. S. Lindsay, who still had hopes of winning over the ministry; but Palmerston held off pursuing a policy of "watchful waiting." It was quite evident to English official circles that both sides were ready to quit in the American war.

Russia was still true to the promise made Bayard Taylor. She would not receive the Confederate commissioners; and Germany could see no object in

abandoning her position of neutrality. Besides, she was already involved through a loan of some millions of marks to the North.

It was from France that the Confederate government hoped for the creation of a formidable navy which could force the blockade. Secretary Benjamin, however, paid too little heed to the characteristics of Napoleon. The Emperor was a trickster; his hostility to the South was no less pronounced than that of England, yet he obscured it under profuse expressions of friendship. France wanted Louisiana to accompany the newly founded Empire of Mexico. France wanted an accomplice in her rape of the western hemisphere; and the rumors of French aid were kept alive by these astute officials until the loss of Richmond destroyed all chance of Napoleon's dream and the Confederate vision.

France could not move with a program of recognition until England was ready. And England was not inclined to make any hurried move. The chance for intervention was gone, unless an exasperated Europe should intervene to compel a cessation of hostilities. This was hoped for by the South and feared by the North. Secretary Seward went so far in April as to say: "We must finish the Civil War soon or we shall get into a war with England." Three years of war had closed a fruitful market to Europe; and Europe needed markets badly in 1864.

In June the tide turned again toward the South. The very inability of Grant to close with Lee evidenced that the South might still go her way in peace. All Europe knew of the peace overtures made by President Lincoln; and the warweariness of the North was gossiped around the courts of Europe. It was clear that the end was in sight, and that two nations instead of one would become the political playgrounds for the diplomats. No nation was willing to risk offending either the North or South when new treaties must soon be made. The British sympathies were again with the South in spite of all that Mr. Adams and his associates could do.

The South would be content with recognition. Just before Mr. Mason's return to the status of a private citizen in England, he received a lengthy letter from Secretary Benjamin outlining the newer appreciation the secretary held of the stand England would take. "We have," he said, "long ceased to expect from England any other action than such as may be dictated by our enemies to suit their own policy, and look with little interest to any deliberations of their public men, being able to judge by the past what their acts will be under any circumstances . . . we confine ourselves to the simple demand for recognition; that recognition will end the war, *from whatever quarter it may come, and that nothing else will.*" The italics are the secretary's.

A new source of power in Europe came from the sudden interest that His Holiness Pius IX took in the South and her problems. The lagging spirit was reborn as this new ally spoke for the one hundred seventy-five million Catholics of the world. The stumbling block was slavery; but this could be arranged. And the Commissioner to the Vatican was empowered to promise emancipation and certain other requests in return for the friendly offices of the Pope. But before the machinery of diplomacy could turn to lasting profit, the At-

lanta campaign was over, and the good wishes of the head of the Catholic church could avail nothing.

When the soldiers of Sherman's army commenced their march toward Georgia, the South had seen herself unsuccessful in Europe and had turned to Canada as the field for active work. She hoped through her agents there to embarrass the United States in every way by helping the Democrats to win the elections, and to foster the spirit of revolt in the Northwest by aiding the Order of American Knights and other societies. To meet this new program the Confederate congress appropriated secretly one million dollars, of which $900,000 fell into the hands of Jacob Thompson and C. C. Clay, who used it to further the aims of the insurrectionists in the Northwest.

The foreign situation was neither helpful nor friendly to either the North or the South. It was evident that a decision must soon be reached or pressure would be brought to have the war stopped. The shortage in cotton, while not acute, was a matter of concern to England, and her controversies with Seward were fast approaching the quarrelsome state. The South was in a mild despair, while the North saw visions of a war with one or more of the European powers.

IV.

The start of the Atlanta and Richmond campaigns found the South unprepared, although General Lee had soon discovered the dual threat against Richmond and the deep South. His first surmise had been that the main effort would be directed against either Johnston or Longstreet, but a few days were sufficient to expose this error, and, on March 30, the fact that the main attack would be against his army, coupled with a movement against Johnston, formed the burden of a special letter to the Confederate president. This warning anticipated in detail the danger to be expected and gave wholesome advice that Richmond should be cleared of everything not absolutely needed. In spite of this warning of what to expect, the president failed to order the best movements for meeting the danger; nor did he attempt to make use of his facilities to operate on interior lines, better to stop or delay first one and then the other of the advancing forces.

The advance in the east commenced with the battle of the Wilderness which raged for some six weeks and cost some fifty thousand men. Although outnumbering Lee about two to one, Grant was never able to close with Lee and bring on a decisive engagement. The hopeful part of the situation was Grant's ability to hang on and edge his way toward Richmond undaunted by his tremendous losses.

It was while the Repbblican and Union conventions were in session that the battle of Cold Harbor was fought. Had the president blundered again in his choice of a general? Those were anxious days in the White House. But Lincoln had a general—in fact, two of them. For Grant and Sherman were working as one, and had been ever since the impetuous Sherman had replied to Grant: "Dispatch received. All right. We will be on time."—and the Atlanta campaign was on.

Baffled in his attempts to bring Joseph E. Johnston to grips, Sherman made progress in spite of his failure. He occupied Resaca on May 15, and entered Cassville a week later. Facing a general whose defensive skill was see-

ond to none in the Confederacy, Sherman was forced to grub along, and nothing startling came of his series of maneuvers. May passed into June and still the North was without that victory needed to solidify public support behind the President. Even the most hopeful of the Northern papers grew cynical when the month of June passed with Sherman fuming about Kenesaw mountain. Rain, mud, natural defenses in depth, and a skillful defense had changed Sherman's tactics from the rapid maneuvers of the earlier days to a wallowing around in red clay and matted underbrush, where sheer weight counted. It was skilfully done—ably done—but the people were not interested in Sherman's troubles; they wanted a victory and the termination of a troublesome and costly war.

The great and magnificent Butler appeared before Richmond, and, when fronted by the old and infirm armed with broomsticks and flintlocks, just as rapidly disappeared again. He withdrew gracefully to Bermuda Hundred where he remained until the war was ended. Great was the derision of Wilbur Fiske Storey, who lashed Lincoln through the columns of the *Chicago Times*, with his, "blessed Ben Butler was safe at last behind the fortifications at Bermuda Hundred. How relieved the people must be." The index of Democratic stock mounted while that of the Lincolnites fell to a new low.

July opened with Early's raid through Maryland and to the outskirts of Washington where he and his staff enjoyed the fine wines with which the cellars of Francis P. Blair were stocked. For a third time the politicians were palsied with fear, and demands were made on Grant to return to the capital and rescue the Government. As the month was ushered out, the fair city of Chambersburg was put to the torch, while the cautious Dutch farmers lost the choicest of their beeves and sheep. Great was the public indigation, but greater still was the desire to end it all. It was the end.

August found the President seeking informally to arrange peace with the South on a basis of a restored Union and emancipation. With the vision of a greater victory in her near future, the South declined. It must be all or none; and the northern President lost much of his remaining power when the news of this abortive peace attempt leaked out. Henry Winter Davis had suspected it, and wrote that "if Lincoln try an embassy to Richmond, it finally disgusts the country." Even Greeley was called in to meet with Clay and Thompson at Windsor, Ontario, but the Confederate agents had no powers to treat of peace. Their mission was to detach the Northwest from the Union and defeat Lincoln at the polls; while the Confederate president was assuring Lincoln that the Confederacy would not permit the Northwest to join them.

When the middle of August came and brought with it no change in the military situation, public opinion had turned from Lincoln to such an extent that the political leaders sent out a call for a new convention which was "to consider the state of the nation and to concentrate the Union strength on some one candidate who commands the confidence of the country, even by a new nomination if necessary." Although this call was circulated in secret, it was widely distributed and served to make articulate the distrust

of the President. The responses to this call are illuminating.

John Austin Stevens, Jr., is supposed to have been the author of the call. The convention was set for Wednesday, September 28, in Cincinnati, Ohio. In this call he was backed by many previous Lincoln supporters and the old group of anti-Lincoln Republicans—including practically all of the pro-slavery Northerners. The first to respond was Horace Greeley. He said: "Mr. Lincoln is already beaten. He cannot be elected; and we must have another ticket to save us from utter overthrow." Chase—the cautious former secretary of the treasury—was next. He wrote George Opdyke: "I sincerely hope that the deliberations of the gentlemen who will confer under your roof may be fruitful of benefit to our country. . . ."

Henry Winter Davis was, of course, definitely arrayed against the President. He wrote on August 25 that "letters from Maryland say that Lincoln can do nothing there even where the Union party is most vigorous, and everybody is looking for a new candidate from somewhere." (Mr. Davis was not declining the honor of being the "candidate from somewhere!") The Honorable Ben Wade, of Ohio, was another who had turned against Lincoln and "was sanguine" of having a new candidate. Mr. Davis promised a good start in New York and the New England States, and threw in for good measure Pennsylvania, Delaware, Ohio, and Michigan. Ben Wade and Whitelaw Reid were influential in Ohio, and Pennsylvania was still the political playground of the ex-Secretary of War Cameron, who had been so offensive to decent people while in office.

John S. Prettyman was certain of Delaware, and wrote that "our people *all* admit now that Lincoln's nomination at Baltimore was wrong." And Amasa Walker of Massachusetts wrote that the call had his "full sanction." General Butler was also mixed up in the business, but was entirely too clever to commit himself. He also had the vision of the White House before him.

New York was well represented by Senator Conkling and D. S. Dickenson. The latter wrote that he was "full of anxiety and alarm over the manifest downward tendency of things." He had supported Lincoln to the limit, but now was averse to putting any more faith in a losing candidate. "Men, mere men," he added, "their wishes, their claims and necessities should not for one single moment stand in the way of Union success, and I cannot believe that Mr. Lincoln, if fully advised of the state of the public mind, would desire to enter upon a canvass. . . ." And, evidently, the President had some knowledge of the political state, as he penned a memorandum which tacitly admitted defeat, and laid down his program of support for the incoming administration.

The opinion in the South was that Lincoln was already defeated, and Secretary Benjamin outlined the new program of the Confederacy which was based on the election of McClellan and a belief that Lincoln would deliberately do the wrong thing merely to embarrass his former general.

The recital could be continued until evidence became massed to show how seriously the people considered ousting the President even though he had won the nomination. The letters passed from one to another of the leading

politicians until the event occurred which took "the wind from their sails." And this event was the announcement of the occupation of Atlanta.

On September 4 the "multitudes were rushing to McClellan" if we may believe H. W. Davis and, within but a few days, these same multitudes were rushing back to Lincoln.

V.

So much did the Atlanta campaign do for the cause of the Lincoln party; the success of which meant the salvation of the Union. Grant had proven of little value to Lincoln in his political troubles. He had secured no startling victory. But the country had been startled—not by Grant's successes—by his losses. So great had been the loss at Cold Harbor that the War Department had feared to make public the news. It seemed during those weeks that Lincoln's last general was unable to bring the long-desired end of the war. To whom could the President turn?

Butler was left; and Banks, and Sherman. But Banks was in disrepute and Butler had lost the respect of his soldiery. Sherman seemed lost in the mazes of the southern forests. It must be Grant—win or lose—and the eyes of the White House turned more and more anxiously to where the Army of the Potomac lay sweltering around Petersburg, impotent and immobile. The weeks had passed into months, and all hope seemed gone. The probability of defeat at the polls coupled with the inability of the armies to defeat the South drove Lincoln to the point of arranging peace—peace at any price, provided the Union was kept intact. But the South declined, and Lincoln turned back to his hopeless task. There was little fight left.

But good news was in the air. The sputtering and dynamic Sherman had thrown his forces around Atlanta, and on the same day that the "multitudes were rushing to McClellan," the telegram arrived that the "XX Corps now occupies Atlanta and the Chattahoochie bridges."

Well may the President have wired the "national thanks" to Gen. W. T. Sherman. Without the continued pressure which that indefatigable leader gave to his enemies, Atlanta would not have fallen, and the Lincoln government would have gone down to defeat at the polls. Without Sherman, the strategy of the South would have succeeded—she would have won a stalemate.

None knew better than Sherman the political effect of his victory. He wrote to Halleck on September 4, "If we can carry our people past this fall, we may escape the greatest danger that ever threatened a civilized people." He "hopes the administration will be satisfied"—which no doubt it was—and that he may be permitted to rest his army. Mr. Lincoln's face beamed. He had solved all of his problems. He had his victory in the very nick of time.

Notes from the Chief of Infantry

Commissioned Personnel, Office Chief of Infantry

Chief of Infantry
MAJ. GEN. STEPHEN O. FUQUA

Executive
COL. LORENZO D. GASSER

Section I—Personnel
COL. C. C. ALLEN
MAJ. E. F. RICE
MAJ. L. S. HOBBS
MAJ. P. C. PASCHAL (Temporarily assigned)

Section II—Intelligence
MAJ. T. B. CATRON
MAJ. S. J. CHAMBERLIN

Section III—Training and Inspection
LIEUT. COL. E. J. MORAN
MAJ. B. MAGRUDER
MAJ. C. H. BONESTEEL
CAPT. W. G. LAYMAN

Section IV—Arms and Equipment
LIEUT. COL. E. BUTCHER
MAJ. T. LAWRENCE
MAJ. J. D. PATCH
MAJ. H. TERRELL

Section V—Mobilization and Organization
COL. F. W. BUGBEE
CAPT. P. E. LEIBER

Infantry Antiaircraft Practice

AN interesting index as to the degree of efficiency which may be attained by infantry units in combating aircraft is contained in an article in this issue of the JOURNAL. This article[1] tells of the practice of the 3d Battalion, 12th Infantry.

It must be considered that the practice of the 12th Infantry was limited, and the results, although indicative of what training will do to perfect infantry defense against aircraft, must not be considered as conclusive. The value of this practice lies not so much in the results obtained as in the studied attempt of those who conducted the practice to improve the means and methods of training the Infantry to combat aircraft, outlined in tentative training regulations 300-5.

It is not desired to indoctrinate the Infantry with a feeling of false security when confronted with the operation of aircraft. It is admitted that the

[1] See page 227.

latter constitute a menace to infantry operations if the Infantry in turn does not adopt neutralizing action. Efficient operation of aircraft may materially lessen our ability to surprise. They have power to cause considerable delay. They can cause severe casualties in untrained and poorly disposed infantry. Neither is it desired to encourage a belief that the infantry is at the mercy of aircraft. We can still obtain surprise by proper use of concealment, assisted by friendly aircraft, or by night movement. Delay may be lessened by proper march discipline and disposition. We are convinced that the casualty and morale effect of aircraft bombing and machine gunning can be materially lessened in the Infantry by proper offensive and defensive action. Rather we contend that by the correct employment of methods and means, we can neutralize the effect of aircraft in these three particulars. The improvement of existing methods and means, and the training of troops accordingly is one of the most important problems we now confront.

In no field of endeavor is the old saying "distance lends enchantment" more appropriate than in the field of Infantry-aircraft combat. The Infantryman feels and it is true that his safety varies directly with the height of aircraft attack. The aviator is likewise safer from ground offensive efforts the higher he flies. There was a tendency during the World War which is even yet evident, for the flier to disregard this truth. It therefore becomes the aim of the Infantryman to convince the aviator, by causing prohibitive loss in low flying, that his "floor" is the maximum effective range of infantry arms, and this an altitude sufficiently high to decrease materially the effectiveness of aerial attack. In other words convince the aviator that enchantment for him lies at altitudes where the effect of aerial attack on foot troops is no more than other battlefield dangers.

Perfected methods and means of offensive action against aircraft will, no doubt, eventually be developed. It is not necessary, however, for the Infantry to await perfected means. First, because they may be impracticable (since the new means may call for additional armament), restricted in weight, or too delicate for infantry service. Second, because, by such experiments as those of the 12th Infantry, we are adding proof that the weapons which we now have are capable, in the hands of trained and disciplined Infantry, of causing considerable annoyance, that, in fact, they bid fair to succeed in driving aircraft to altitudes which will greatly restrict their ability to observe, delay, and cause casualties. Our present methods are proving satisfactory as a basis. More varied practice will bring steady improvement in method.

During the World War there were no uniform methods adopted for infantry defensive or offensive action against aircraft. Stories have been told, how units adopted a method to protect themselves. In one instance, the commander of a headquarters unit directed his subordinates upon the approach of an airplane to get out and use pistols offensively instead of using the defensive method of scattering and hunting safety. The story goes that no airplanes were brought down but that the firing was so disquieting to the aviators that they were thereafter strongly inclined to seek less combative targets. This instance illustrates the

basic principle upon which our action against aircraft must be built. *Every Infantryman must use offensively the weapon with which he is armed.*

Such use of infantry weapons, to be effective, must, however, be disciplined and controlled. The use of weapons must be likewise accompanied on the march and in bivouac by the proper disposition of the individuals of the command to lessen the danger of aircraft attack and to place them in positions favorable to the use of their arms. In addition, a standard and effective method of alarming troops of the approach of aircraft must be developed. The tentative training regulation 300-5 has been published to guide thought and to be used as a basis for further study and experiment. Infantry regiments are now receiving their first training in combating aircraft. It is especially desired to emphasize the fact that these regulations were prepared from limited data and that the provisions are general in nature and subject to great improvement. Each officer and man who trains in antiaircraft practice during this season or subsequently is encouraged to experiment extensively in this field. It is a well recognized principle that perfection is obtained only by repeated trial, the results of which vary from success to failure. Further, if the details of these trials and the results are known, the lessons drawn from the successful ones can be immediately put into practice, while eventually the failures will be properly interpreted and turned to success.

Because of this, the Chief of Infantry has recently requested regimental commanders to encourage individual study and experiment in the field of infantry antiaircraft defense and has suggested that some individual in each regiment who is acquainted with the practices prepare an article or a series of articles to be published in the INFANTRY JOURNAL. The columns of the JOURNAL are a place in which the experiences of antiaircraft practice may be recited and in which everyone may have the opportunity to learn of the failures or the improvements of others. The Chief of Infantry considers that each experiment that has a new or unusual character, regardless of its success or its failure, will be useful in perfecting our defense against aircraft and should be recited for the benefit of others.

As an added inducement and incentive to investigations in the antiaircraft field, the Chief of Infantry has secured an allowance of one hundred thousand rounds of caliber .30 ammunition to be used in practice against towed targets. This ammunition has been recommended for distribution to corps area and department commanders for regimental practices. Twenty-two regiments will have the advantage of this practice during 1929. It is believed that many experiences of value supplementing those of the 12th Infantry will be learned in this, the first antiaircraft practice of large proportions in the Infantry of our Army.

Because of limited terrain, unavailability of aircraft or other urgent reasons, the remaining sixteen of our regiments will not fire on towed targets during the current season. This will not affect, however, the efficiency of these regiments in antiaircraft defense. The small-bore exercises afford the principal means of teaching offensive

action against aircraft. The firing against towed targets might be compared to the record course in qualifying with arms; it is the test to determine progress in fundamental training.

(I)

Smooth Bore Mortar

PRELIMINARY experiment of using the 75-mm. mortar as a smooth bore weapon, with a specially developed vaned projectile, has proven so successful that a number of mortars with the necessary ammunition are being manufactured for an extended service test.

75-mm. Smooth Bore Practice Shell with C8 Fins

The 75-mm. rifled mortar, although found to be satisfactory, had certain characteristics which were undesirable; namely, a minimum range of six hundred yards and a tendency of the projectile to excessive and variable drift. In an attempt to correct these troubles the Ordnance Department developed the vaned projectile, shown in the accompanying cut, to be used wtih the smooth bore 75-mm. mortar.

From limited demonstration firing before the Infantry Board, it was found that by using the smooth bore mortar and the vaned projectile, ranges of from three hundred yards (minimum) to two thousand yards (maximum) could be obtained. Excellent shot groups were made at all ranges. The large drift, characteristic of the rifled mortar, was eliminated. The amount of explosive carried in the vaned projectile is closely comparable with that in the rifled mortar shell.

Further development of the fuze of the vaned projectile is under way. Following the manufacture of the additional units, there will be a service test, probably by the 29th Infantry, under the supervision of the Infantry Board.

Reorganization of the Infantry Battalion

AS a first step in a study looking to the reorganization of the war strength infantry battalion, the 29th Infantry, under the supervision of the Infantry Board, will test out during this summer and fall various types of battalion war organizations. Following these practical tests and the submission of reports concerning them, the subject will be studied by the General Staff and finally by a board of senior officers, prior to approval of permanent changes in organization. Two types of a battalion organization, differing materially from our present war organization, have been tentatively selected as a basis for experiment. Other combinations may be tried out if time permits. Other than the removal of the howitzer company from the regiment and the assignment of the platoons to the battalions, the tentative plan does not at present contemplate reorganization of infantry units. above the battalion in the division, except insofar as strength is changed in sympathy with underlying changes in the battalions. Decision as to the reorganization of other units of the division will await conclusion as to the type of infantry battalion found desirable. The experimental battalions, considerably larger than the existing battalions of the 29th Infantry, will be formed in turn by breaking up temporarily other units of the regiment.

The present organization of the infantry division was made after the World War based on studies at that time. Since then, infantry machine guns have been increased fifty per cent. Further experimentation and study have brought forth the belief that by using additional existing automatic weapons and equipment a more powerful fighting unit can be developed. The experiments to be conducted during this summer and fall are aimed at finding an organization which, without decreasing mobility or increasing vulnerability, will take full advantage of existing weapons and equipment and thereby develop the maximum firepower, increase the ability to make a long sustained effort, and make possible a more tenacious holding of the ground gained. Reorganization which contemplates utilizing new weapons and equipment not yet supplied and weapons and equipment under development will be handled as future events warrant.

In both types of tentative battalion organization the composition of the rifle, machine gun, and battalion headquarters companies is the same. The rifle company will contain about six officers and two hundred and fifty-one enlisted men. It will be divided into a company headquarters of two officers and twenty-three enlisted men; an automatic rifle platoon, one officer and fifty-seven men, composed of a platoon headquarters and six squads of eight men armed with four automatic rifles; and three rifle platoons, similarly organized, but armed entirely with the magazine rifle. An alternative combination may be to place the automatic rifles in the squads as at present, or to assign squads of automatic riflemen to the rifle platoons. In these events, there will be no automatic rifle platoon, but four rifle platoons. The machine gun company will have approximately seven officers and one hundred and ninety-one men. It will be composed of a com-

pany headquarters of three officers and twenty-three men; three caliber .30 machine gun platoons, of one officer and forty-one men each, divided into four squads of eight men armed with one caliber .30 machine gun; and a caliber .50 machine gun platoon of one officer and forty-five men similarly organized, except that the squads are nine men strong, and each squad has a caliber .50 machine gun. The battalion headquarters company is modified by the addition of one howitzer platoon, one officer and fifty-nine men, armed with one 37-mm. gun and two infantry mortars. The new strength becomes eight officers and one hundred and twenty-three men.

One type of battalion, the first to be experimented with, calls for four rifle companies, one machine gun company, and a battalion headquarters company. The strength of this battalion will approximate twenty-nine officers and one thousand three hundred and eighteen enlisted men. The second battalion to be experimented with will comprise two rifle companies, two machine gun companies, and a battalion headquarters company. The strength of this battalion will be about thirty-four officers and one thousand and seven men.

The table below, containing information of strengths and armaments of various types of battalion organization in the last twelve years, is of interest.

In the 1918 tables the machine gun personnel of the brigade and regiment, and the howitzer company personnel of the regiment, with the weapons that they handle, have been apportioned equally to the battalions. This is also true of other type organizations in which the weapons which are organic in the tentative battalions were not organic at the time.

	Strength	*Rifles*	*M.Gs.*	*Auto-Rifles*	*Trench Mortar*	*37-mm.*	*Pistols*	*Ratio of Rfls. to men*	*Ratio of M.Gs. to men*	*Ratio of auto-Rifle to men*	*Ratio of auto-arms to rifles*
World War 1918	1119	940	8	64	2	1	415	1-1.2	1-140	1-17.5	1-13
Post War 1921	873	537	8	54	1	1	351	1-1.6	1-109	1-16.2	1-8.7
1929	882	546	12	54	1	1	282	1-1.6	1-73.5	1-16.4	1-8.3
Tentative 4 rfl. cos. 1 M.G. co.	1357	799	16	96	1	2	462	1-1.7	1-85	1-13.1	1-7.1
Tentative 2 rfl. cos. 2 M.G. cos.	1041	462	32	48	1	2	531	1-2.25	1-32.5	1-22	1-5.8

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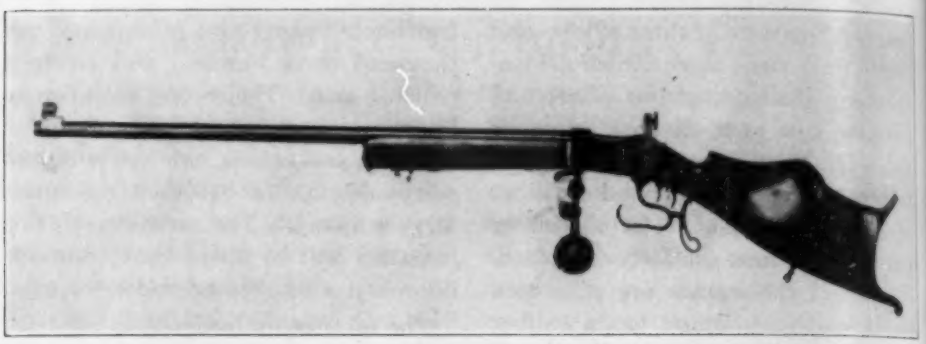
Sergeant Sharp, Eighth Infantry, Represents The Infantry in International Shoot

SGT. J. H. SHARP, 8th Infantry, represented the Infantry on United States Free Rifle Team which participated in the International Matches at Stockholm, Sweden. Major Per Ramee, Infantry, accompanied the team as one of the team officials.

The International Matches differ widely from matches held in this country. The rifle range is a walled-



The Martini Rifle

in enclosure, having only the target end open. The firing points are covered. The shooting is done at three hundred meters. The target consists of ten concentric circles. Great liberty is allowed in the type of rifle used. The rifle the United States Free Rifle Team used in 1928 and 1929 is the Martini rifle, shown in the accompanying cut. It is manufactured in Switzerland and is especially chambered for the Springfield cartridge. The Martini rifle is approximately ten pounds heavier than the Springfield.

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Caliber .45 Tracer Ammunition

THE third test of the caliber .45 tracer ammuntion, just completed by the Department of Experiment under the supervision of the Infantry Board, is still inconclusive. Although this ammunition shows its usefulness for night signalling and target designation, and has a limited value as an illuminating and incendiary agent, its inability to provide for day-time signals has brought the conclusion that this ammunition should be further developed before action is taken toward its adoption or nonadoption.

The project of developing tracer ammunition for the caliber .45 pistol was started in 1925. A test was held in that year and in the following year to determine the utility of this ammunition. The third test has just been completed. The results obtained in the last test have indicated that, as a signalling agent, caliber .45 tracer ammunition is superior to the Very pistol at night and on a dull day. The length of trace, effective to one thousand two hundred yards, provides a signal which lasts much longer than the cartridge from the Very pistol. The long trace permits the entire pistol magazine of shots to be in the air before the first shot dies out. In bright sunlight, however, the caliber .45 tracer is inefficient. For target designation, it was found that the caliber .45 tracer ammunition was superior to the caliber .30 tracer ammunition, especially when in the hands of expert pistol shots. It provides, however, even in the hands of average shots, efficient means for target designation under all conditions

of light. It was found to provide some illuminating value on closely adjacent targets at night and was superior in this respect to the Very pistol. As an incendiary agent it was found to be more effective than the caliber .30 tracer ammunition. It ignited dry wooden posts and grass at ranges up to one thousand four hundred yards.

The principal defect of this ammunition is its inabiiity to provide for signalling during day-light. The Very pistol is likewise not satisfactory, but is superior to the caliber .45 tracer for day-light signalling. The characteristic of the Very pistol ammunition which makes it more efficient in day-light, is the smoke trace of the ammunition. Recommendation has now been made that a smoke trace be provided for the caliber .45 tracer in order to correct its inefficient performance during daylight. The great advantage of utilizing the caliber .45 pistol for the various uses above cited is that it is included in our present armament. A large number of caliber .45 pistols are in the hands of the leaders of combat units. Development of a satisfactory caliber .45 tracer would obviate special armament for signalling or for the other purposes mentioned, and would provide many individuals with signalling apparatus.

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Five Batallions of Infantry to be Made Inactive

TO provide the necessary enlisted men for the third annual increment in the five-year Air Corps expansion program and permanent personnel for corps area headquarters detachments, five battalions of Infantry will be rendered inactive.

The battalions selected for disbandment are:

1st Battalion, 13th Infantry, Fort Strong, Mass.
3d Battalion, 8th Infantry, Fort Moultrie, S. C.
1st Battalion, 10th Infantry, Fort Thomas. Ky.
3d Battalion, 6th Infantry, Jefferson Barracks, Mo.
2d Battalion, 17th Infantry, Fort Des Moines, Iowa.

In 1926 Congress directed an increase of four hundred and three officers and six thousand two hundred and forty enlisted men in the Air Corps. The increase was to be made in five approximately equal annual increments. Since additional funds were not appropriated to provide for this increase in personnel, it is being made by decreasing other branches of the Army. The third increment for the Air Corps increase calls for one thousand nine hundred and sixty enlisted men. In addition to providing for Air Corps increases, it has been found necessary to provide permanent detachments for corps area headquarters, to increase the enlisted detachment at the General Service Schools at Fort Leavenworth, and to augment the signal battalions of the Army. These rearrangements of personnel must likewise draw on other branches of the Army.

The entire increase in personnel which must be deducted from other branches this year is two thousand five

hundred and seventy-five. Of this number the Infantry share is one thousand four hundred and twenty-one men.

The Infantry met its share of the personnel requirements of the Air Corps in the first and second increments by reducing the number of authorized grades and ratings in existing regiments. This method so depleted infantry regiments that for the third increment it was necessary to render the battalions indicated above inactive. There now remain two annual increments of the increase to be made for the Air Corps. Of the thirty-eight Infantry regiments at present in active service, six have one inactive battalion. The battalions rendered inactive as indicated above increase the number of regiments that have only two battalions to eleven.

Other branches lose enlisted men as follows to provide their share of the 1929 increment: Cavalry, three hundred and twenty-one; Field Artillery, five hundred and forty-seven; Engineer Corps, one hundred and forty-one; Ordnance Department, seventy-five; and Chemical Warfare Service, ten.

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Schedule for Tank School

THE Schedule of Instruction for the Tank School, year 1929-1930, has been prepared and approved. The approved schedule provides for one thousand one hundred and twenty-one hours of instruction, an increase of approximately three hundred hours over the schedule of the past year.

The growing importance of the Tank School is further evidenced by the increase in number of students from thirty-three in the 1928-1929 class to fifty in the 1929-1930 class. This increase provides for the training of a greater number of officers to handle motor transportation. The increased number of officers is drawn from infantry regiments. In addition to the number of motor vehicles that are assigned to practically all infantry regiments there are three regiments in the continental United States and five on foreign service which are partly and one regiment completely motorized.

Because of the increased student body and the desire to instruct in all motor vehicles likely to be included in infantry transportation, a marked revision of the courses at the Tank School becomes effective during the coming year. The old Battery Care and Maintenance, Motor Driving and Maintenance, Heavy Mechanical and Light Mechanical courses disappear and are absorbed into other courses. The Tank Gunnery course now includes firing the Tank Marksmanship course. The Reconnaissance course will be devoted primarily to interpretation of aerial photographs. The new courses in the approved schedule and the number of hours to be devoted to each are given below:

Gunnery	120	hours
Motors	375	hours
Motor chassis	111	hours
Light tank chassis	24	hours
Light tank driving	45	hours
Heavy tank chassis	24	hours
Heavy tank driving	63	hours
Motor transport	45	hours
Light tank overhaul	27	hours
Heavy tank overhaul	30	hours
Reconnaissance	81	hours
Tactics	81	hours
Chemical warfare school	35½	hours
Convoys	30	hours
Trips	30	hours
Total	1121½	hours

Editorial

Pay

ALL officers are by now familiar with the report of the Interdepartmental Pay Board. Any action that may follow from this report will affect favorably all officers of the Army, whether Regular, National Guard, or Reserve. It should receive their full approbation and legitimate support.

It is worth emphasizing that the report proposes a pay schedule, the increases in which conform closely to the increase in cost of living since 1913. Since the report is a compromise that takes into account the interests of six Services, there are undoubtedly some details in it that individual officers can approve only by giving up some pet ideas or personal applications of their own. But even so, adoption of the schedule would give them more money than they receive now, would give them adequate pay, and would remove one of the serious hardships of Army life.

Since the representatives of six Services were able to agree unanimously on the pay report, all members of each of those Services should, if necessary, subordinate personal ideas and interests and give the report the approval and the support to which the earnest, enlightened and broad gage efforts of the Board entitle it. These men have done their part. Let us now do our part, and for once show Congress and the country that we are reasonable people, and that we can all fall in behind a reasonable proposition that is designed to give us what we may reasonably ask and to which we are reasonably entitled.

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Our Pay

When you come to the end of your monthly pay,
And you sit alone with the thought
That you've spent it all since the dawn of day
For things which your wife has bought.
In sorrow you gaze on your check-book's stub,
With its balance of thirteen cents;
Where has it gone?—Ah, there's the rub—
And whither and why and whence?

So this is the end of my monthly pay,
And the month still young and new,
And payday still far, far away,
And so many bills still due!
I can't think where it has gone or went,
And I fear that my heart will break,
For just in an hour or two I've spent
What it took me a month to make."

The Infantry

REGULAR — NATIONAL GUARD — RESERVES

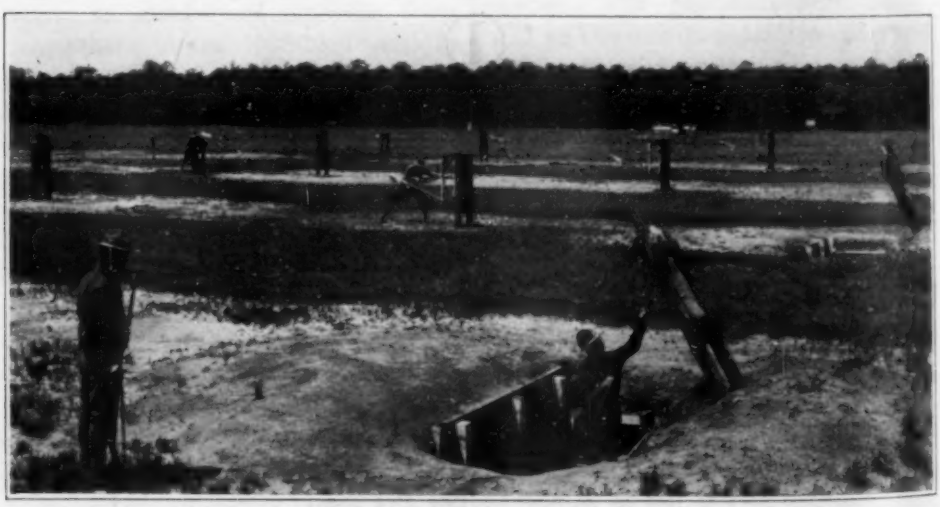
Regular Infantry

THE Hawaiian Division held its Horse Show on May 16 and 17. Civilians and soldiers to the number of more than six thousand were present. Civilian entries won two first places, one third place, and one fourth place, with a total of twenty-four points. Of the military units, the 35th Infantry won the greatest number of points, with a total of ninety-three. After it came the 27th Infantry, with seventy-one points, and the Headquarters, 22d Brigade, with sixty-six points—which gave the 22d Brigade an aggregate of two hundred and thirty points and first place.

The Headquarters Company, 16th Brigade, Fort Hunt, Virginia, has added to its list of distinctions by having nine of its members presented with the Honorable Service Medal of the American Red Cross in recognition of the work of these men in waterfront protection and swimming and life saving instruction.

The 29th Infantry, Col. Harris Pendleton, Jr., commanding, closed its most successful bayonet season training with a regimental percentage qualified of 86.54 per cent. Of the one thousand and fifty-five men required to run the course one thousand and eighty-five completed it with an average of 88.83 per cent per man.

Company B, Capt. N. D. Woodward commanding, was the high company of the regiment with 93.4 per cent qualified, and an average of 90.85. Com-



29th Infantrymen Busy With the Bayonet

pany B also had the smallest number of men to fail to complete the course.

Ⓘ

Thursday, July 18, was 30th Infantry Day at the Annual California Rodeo at Salinas. The 30th Infantry band led the Rodeo parade and played during the performance. Many officers and men of the regiment were guests of the Rodeo Committee on this occasion.

Ⓘ

A test held during the Hawaiian Department maneuvers in June answered the question as to whether or not Infantry, tanks, and tractors can go through or over full-grown sugar cane. When ready for cutting, sugar cane is from one to two inches in diameter, very thickly matted, and higher than a man's head; and the ground is often soft and muddy from irrigation.

A platoon of Company I, 35th Infantry, made the first test, which showed that a rifle platoon in squad column formation can go through full-grown sugar cane. With the leading man of each squad using a cane knife, the platoon made satisfactory speed, but it was almost impossible for the squads to keep their direction.

In the next test, two tanks of the 11th Tank Company went through the cane without any trouble. Since it is possible to keep a tank moving in a given direction unless some large obstacle, such as seldom occurs in a cane field, intervenes, infantry following closely in the wake of tanks advances faster than it could alone and maintain its direction. This seems to be the ideal way for infantry to advance through large sized cane.

Ⓘ

The 45th Infantry, Col. E. A. Myer commanding, took special pleasure in celebrating its Organization Day on June 4 of this year. The reason was that the regiment had just completed an unusually successful season on the target range.

Lieut. Col. C. S. Hoffman took advantage of the Annual Commendation Review to give public praise to some forty enlisted men for especially meritorious service during the year. Capt. Owen Summers, the regimental adjutant, saw to it that the day was filled with interesting events for both the officers and the scout soldiers and their families at Fort William McKinley. The detached companies at Camp John Hay, Baguio, and Pettit Barracks, Zamboanga, held their own similar celebrations.

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The machine gun school of the I Corps Area opened on July 1, 1929. The plan of concentrating the machine gun companies in the I Corps Area for special field training was first tried out in 1927 with such excellent results that it has been made a regular part of each year's training program since that time. Capt. George A. Murray, 5th Infantry, who commanded the school in 1928, is again in command this year, with Capt. Harry J. Collins, Infantry, instructor in machine guns at the Infantry school, as senior instructor. The course includes practical field training in direct laying, extended order, sight and position defilade, use of instruments, indirect laying, antiaircraft firing, and combat practice. Represented at the school are companies D and H, 5th Infantry, companies D and M, 13th Infantry and the Howitzer platoons of both regiments. These organizations arrived on June 25, 1929, at Underhill Center, Vermont, where the school is located, hav-

The Chief of Infantry's Combat Squad
Corp. Louis Walerwicz's squad, Co. E, 15th Infantry

ing marched overland from their home stations.

The training in direct laying was completed on July 20, 1929, and on July 22 competitive tests with all companies competing were held to determine the company most proficient in direct laying. Representative groups of men from each company were chosen by lot regardless of rank and were tested in every phase of direct laying, which included range estimation, use of the gunner's rule, use of the leader's rule, sight and position defilade, fire distribution, and the command of squads and sections by privates. A pennant with the letters "D L" embroidered upon it to represent direct laying was offered for the winning company. Company H, 5th Infantry, Capt. Max G. Oliver, commanding, won the competition.

Company M, 13th Infantry, Captain Ira E. Ryder commanding, won the competition to determine the best appearing machine gun squad. The competition was held on July 20, 1929, and included not only the appearance of the men, but also that of all equipment pertaining to the machine gun squad.

Ⓘ

National Guard

ON July 18, at the presentation of colors to the 1st Virginia Regiment at Virginia Beach, Virginia, Col. Patrick J. Hurley, the Assistant Secretary of War, made the following address. Without detracting at all from the regiment to which it was addressed, and altered only in matters of detail, the thought that Colonel Hurley expressed applies to many a regiment of the National Guard.

To receive your new color there stands before me the color guard of the 1st Virginia, worthy of the traditions of the regiment. But in my mind's eye they have not taken their post alone. Behind them are ranged in spectral assembly the color guards who carried the regiment's flags into battle during the two hundred and fifty years of its existence. There stand the brawny Henrico County militia, men of the axe and musket, men banded together under the pressure of imminent danger as well as at the call of the Old Dominion. Next, under the British Jack, is George Washington's 1st Virginia, the soldiers of Great Meadows, the hardy Colonials that held the forest line when Braddock's regulars reeled back before Fort du Quesne. There in blue and buff is the 1st Virginia of our War of Independence, the regiment, first commanded by Patrick Henry, and then by John Marshall, great Chief Justice of the Supreme Court, that later was incorporated in the new country's nucleus of effective resistance—the Continental Line. There waves the flag of 1812. Under it stand the 19th,

the 23d and the 33d regiments; there still we see the 1st Virginia—the name changes, new men take their places in the ranks, but the spirit lives on. Next come the gray-clad men of the 1st Virginia among the volunteers of the Mexican War. Then come the lean and determined, long-enduring soldiers of the Army of Northern Virginia carrying their battle-stained colors against overwhelming odds. They fought a glorious fight. This was the gray flood that under Pickett at Gettysburg dashed up the slopes of Cemetery Ridge and with the blue banner of the 1st Virginia marked the high tide of the Confederacy. These were the gaunt soldiers of Terry's brigade who wept as Lee rode away from them at Appomattox and who, like Lee, dried their tears and applied themselves to reconciliation. Here, under the stars and stripes again, the 1st Virginia is marching with the blue-shirted volunteers of the Spanish-American War. And last of all comes the 1st Virginia with the 29th Division forming the right of the line in the Argonne; with steady tread they go into action driving the enemy before them taking all their objectives. The traditions of the storming of the Heights of the Meuse, of the forest of La Grande Montagne, and of the grim struggle for Hill 361 are all enshrined in the memories of those here who actually participated and emblazoned in the history of our country. They constitute living examples of the ancient and priceless heritage of valor of the 1st Virginia.

In presenting the colors of the 1st Virginia, I pay homage to all these ghostly banners that in my mind's eye stand before me. The history of the 1st Virginia is an epitome of our nation's history; an imperishable record of the matchless valor of American soldiers. They have gone forth to all our wars, they have always returned with laurels. Once again it may be said that "Old Virginia never tires."

The color I present to you today is not the yak tail of the oriental conqueror; it is not the bronze eagle of Imperialism; it is the silken flag of a democracy. Its fabric is frail; it is easily stained. It is a fitting symbol of your immaculate honor and of the honor of your state and nation committed to your care. Your proud task of maintaining its Honor goes on. The glory that has accrued in the past to the 1st Virginia belongs, and rightly so, to the tattered and mouldering battle flags that have led the way over many a hard fought field. This new color is more than a link with the past, more than guerdon of accomplishment—it is an obligation to the future.

Senior Regiment of the South, Cavaliers of Old Virginia—a nation, proud of your achievements, salutes you.

①

The annual armory inspections for the training year 1928-1929 have established a new record for the Porto Rico National Guard.

Of the twenty-seven units inspected, twenty-one received a rating of "Very Satisfactory." The six remaining units received a rating of "Satisfactory." The organizations which these twenty-seven units compose, the 295th Infantry, the 1st Battalion, 296th Infantry, and the State Staff and Enlisted Detachment, all received a rating of "Very Satisfactory."

Based on the percentage of readiness for offensive combat, the Howitzer Company, 295th Infantry, of Mayaguez, tied for first place with the Battalion Headquarters Company, 3d Battalion, 295th Infantry, of San Juan, each with ratings of 95 for training and 90 for equipment. Company L, of Rio Piedras, was a close third and led the lettered companies.

A decided increase in the ratings for this year over 1928 is shown by the following compilation:

	295th Inf.		296th Inf.		State Staff	
	1928	1929	1928	1929	1928	1929
Percentage of readiness for offensive combat considering present strength,						
(1) As to Training	84	87	86	85	84	90
(2) As to Equipment and Material	77	88	82	88	79	85

Col. D. John Markey, commanding the 1st Infantry, Maryland National Guard, submits the following summary of the results of federal and state inspection of his regiment in 1929. He offers the information in the hope that it may be of interest as representing a typical National Guard regiment.

UNIT	Strength	Percentage of Attendance	Average Strength Past Year	Assigned Reservists	Assigned Reservists available in emergency with avg. of 1 yr. service	Personnel in World War	Number with less than one yr. service	Pctg. of NCO's with more than three yrs. service	Pctg. of Enl. Personnel with more than 3 yrs. ser.	No. of men with ROTC or military school training	No. of men with CMTC training	No. of men with service in Army or Navy since War	No. of men enlisting in R. A. or Navy during past year	No. NCO's taking correspondence courses.	No. personnel 100 per cent armory drill attendance.	Average percentage of attendance at armory drills past year, all armory drills
Hdqrs. Company	60	88.71	62	3	3	4	11	35.	16.	0	0	0	0	5	11	74.
Howitzer Co.	60	98.41	50	20	20	3	21	66.	20.	0	1	2	4	6	9	86.
Service Co.	52	96.42	61	16	16	10	19	68.	45.	0	5	0	0	3	0	75.
Band Section	46	100.00	40	0	0	2	15	85.	22.	0	0	2	2	0	11	86.
Medical Decht.	31	97.14	32	5	4	5	10	80.	17.	0	3	1	1	0	9	90.
Hq. Co. 1st Bn.	30	100.00	32	20	10	1	11	90.	48.	0	0	0	0	1	8	93.
Company "A"	68	100.00	70	5	4	4	21	76.	30.	0	0	4	1	3	29	93.
Company "B"	61	100.00	66	13	13	4	24	29.	8.	0	0	0	0	0	9	70.
Company "C"	63	86.36	44	1	1	2	45	17.	14.	0	1	0	2	0	3	68.
Company "D"	63	68.18	63	0	0	2	14	40.	16.	2	0	1	0	0	4	54.
Hq. Co. 2nd Bn.	32	94.12	51	2	2	2	10	60.	21.	1	0	1	0	2	5	94.
Company "E"	63	100.00	67	9	9	0	14	82.	25.	0	0	0	1	1	2	78.
Company "F"	64	94.03	65	6	3	7	6	76.	49.	4	2	2	1	0	8	68.
Company "G"	68	100.00	69	24	18	3	26	47.	17.	1	7	1	0	6	8	73.
Company "H"	60	96.77	63	0	0	3	12	62.	30.	2	3	0	4	1	4	68.
Hq. Co. 3rd Bn.	36	100.00	39	23	17	2	12	60.	25.	0	1	2	1	5	3	82.
Company "I"	63	95.38	68	23	21	5	19	88.	33.	0	3	1	1	1	5	66.
Company "K"	60	82.53	63	13	11	2	19	64.	25.	0	0	1	0	0	7	70.
Company "L"	62	87.69	63	0	0	2	26	47.	16.	1	2	0	0	0	2	76.
Company "M"	61	96.87	64	4	4	4	20	93.	25.	3	2	1	1	1	5	72.
Total for Regiment	103	94.13	1112	189	156	67	355	63.	25.	14	20	19	19	35	143	73.8

The 140th Infantry, Missouri National Guard, has been pushing rifle marksmanship and feels elated over the results that it is getting. The response has been great. For example, the team from Company I, which was the winning team, traveled more than two hundred miles by automobile to take part in the competition. This Swamp-east Missouri National Guard regiment is getting results; the boost that it is giving marksmanship within the regiment is also a boost for marksmanship in general.

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Reserve

Reserves in interesting experiments

LIEUT. COL. LE ROY F. SMITH, 363d Infantry

THE Citizens' Military Training Camp at Del Monte, California, held July 2 to July 31, 1929, is typical of the camps at which for the first time we have tried the experiment of utilizing Reserve regiments to train

this important civilian group.

With a limit of fifteen days allowed for active duty training for Reserve officers, it was necessary to detail one Reserve regiment (the 361st) to duty for the first two weeks, and the other regiment of the brigade of the 91st Division (the 363d) for the final two weeks.

It is the opinion of the writer that the plan works. The supervisionial duties of the C. M. T. camp were, very necessarily, performed by members of the Regular establishment. Col. Roger Fitch, commanding the nearby Presidio of Monterey, was the camp commander; while a battalion of the 30th Infantry, from the Presidio of San Francisco, furnished the permanent enlisted cadre and training and administrative commissioned personnel.

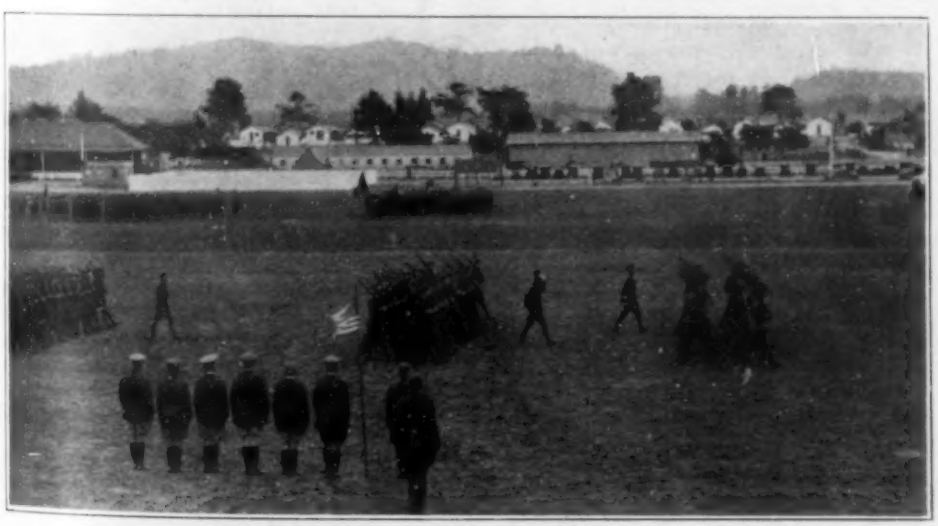
No small part of the success of this camp was due to the splendid cooperation and whole-hearted coordination of the personnel of the 30th Infantry. This regiment has had extended and gratifying contact with the Reserve regiments, and is outstanding in the way it enters into the spirit and mission of training the citizen-components.

The 361st Infantry (commissioned personnel only) reported at Camp John P. Pryor on July 1. It undertook the reception, processing, and the first fourteen days of training of the one thousand two hundred candidates of the C. M. T. C. These latter, organized into companies of a regiment (less special and service units), were officered by the 361st.

Advanced course candidates, as usual, filled the posts of non-commissioned officers and acting cadet officers.

At the end of two weeks, or midway of the C. M. T. C. schedule, the 361st Infantry was relieved and the 363d took its place.

This change of administration, with its attendant introduction of new personalities and new ideas, was the anticipated critical point in the program. But the gap was bridged with quite negligible difficulty. The new officers stepped in and accommodated themselves to the schedule without friction. Preliminary study of the train-



Infantry C. M. T. C. at Camp John P. Prior, Del Monte, Calif., July 2 to 31, 1929

ing program and schedules had been enjoined upon all officers of the 363d by their commanding officer, Col. W. A. McCord, and they came to camp prepared to "take on" promptly.

The plan thus put in practice this year for the first time, accomplishes its two purposes: economy of Regular personnel, and opportunity for Reserve officers, particularly of junior grade, to get much-needed and rarely afforded practice in actual troop leading, training, management, and administration.

It would be an incomparable advantage if a Reserve regiment might be ordered to the C. M. T. camps for the full thirty-day period; it would be of advantage to both the officers and the trainees.

But even until that desirable plan becomes possible the two-shift plan is worth continuing.

ⓘ

The North Dakota Agricultural College rifle team again won the National Intercollegiate Rifle matches for the year 1928-29. Lieut. Frank S. Ross, Infantry, one of the best known shots in the Army and several times a member of the Infantry Team in the National matches, coached the collegians to such good effect that they made a score of seven thousand six hundred and ninety-one out of eight thousand, perhaps the highest score yet made by and R. O. T. C. rifle team.

At a banquet given in honor of the 1929 champions, President Coulter announced that the Athletic Committee had voted to include rifle marksmanship among the major sports of the college.

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At another Western institution, Coe College, at Cedar Rapids, Iowa, is rifle shooting in the ascendant. The Coe College team won the Mid-West Indoor Rifle Shoot this year.

Coe College also has a band, which escorted the Governor of Iowa in the Inaugural Parade this year and played before the President and at a dance given for the Secretary of War, James W. Good, and former Assistant Secretary, James Burton Robbins, both of whom are trustees of Coe College.

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Retrospect

ON account of pressure of official duties Major Jordan has been unable to finish the Retrospect article for this month. The series will be continued in the October number.

Books

Tank and Mechanization Literature[1]

LIEUT. ROBERT J. ICKS, Infantry-Reserve

UPON being assigned to a tank unit (reserve), it seemed desirable to learn something about tanks. It was not particularly difficult to secure the training regulations, but there the matter seemed to end. Almost everywhere the answer from officers was that, owing to the newness of the subject, there was very little literature available. Out of curiosity as much as from any other reason, the writer began using the mails. The results are below. The list is not necessarily complete, but it is a list that some of our officers who are interested in the subject may welcome. It is written in a spirit of helpfulness, and the writer will greatly appreciate being informed of any additions that readers may be able to make.

LIST A. *World War*

AUSTRALIAN VICTORIES IN FRANCE—1918. Monash.
A very complete expression of tank tactics based on Australian experience.

A COMPANY OF TANKS. Watson.
A narrative of absorbing interest.

A BRIEF HISTORY OF THE ROYAL TANK CORPS. Woolnough.

A TANK DRIVER'S EXPERIENCES. Jenkins.
Another good narrative.

DIE DEUTCHEN KAMPFWAGEN IM WELTKRIEG. Volckheim.
A short exposition of the German use of tanks.

HANDBOOK OF THE SIX TON SPECIAL TRACTOR. Ordnance Document No. 1995.

HANDBOOK OF THE MARK VIII TANK. Ordnance Document No. 1977.

LES CHARS D' ASSAUT. Dutil.
Narrative of French tanks.

L' ARTILLERIE D' ASSAUT. Lafitte. Descriptive material.

LIFE IN A TANK. Haigh.
Narrative form.

NARRATIVE HISTORY OF THE 6TH AND 7TH TANK BATTALIONS. Woolnough.
One of many small unit histories (English).

TANKS. Krueger.
British, French, and German tanks from the German viewpoint.

THE TANK CORPS. Ellis.
The most readable narrative of the period.

TANK IN ACTION. Browne.
Similar to the above. Very good.

TANKS—1914-1918—THE LOG BOOK OF A PIONEER. Stern.
By one of the originators. Out of print.

TANKS IN THE GREAT WAR. Fuller.
The standard history on the subject.

TANKS, GAS, BOMBING, AND LIQUID FIRE. Dion.
Written too near the war period.

THE TANK: ITS BIRTH AND DEVELOPMENT. Foster.
Well thought of in England.

THE TANK CORPS BOOK OF HONOUR.
Obtainable through the Editor of the Royal Tank Corps Journal. Decorations.

[1] Titles mentioned in this article are to be had through the Book Department of the Infantry Association.

LIST B. MODERN BOOKS

ARTILLERY: TODAY AND TOMORROW. Rowan-Robinson.

Short, complete, but visionary.

DIE SCHWEREN FRANZOSISCHEN TANKS, DIE ITALIENISCHEN TANKS. Heigl.

On the known heavy matériel of France and Italy.

FOUNDATION TO THE SCIENCE OF WAR. Fuller.

Visionary as are most of his later books.

THE MECHANIZATION OF WAR. Germains.

An enjoyable book. Witty invective is flung at the proponents of extreme mechanization in England.

MAINTENANCE FOR FULL AND HALF-TRACKED VEHICLES.

A War Office publication.

ON FUTURE WARFARE. Fuller.

An interesting book even if extreme.

THE REMAKING OF MODERN ARMIES. Liddell-Hart.

This should be read with Germains' book above.

SOME ASPECTS OF MECHANIZATION. Rowan-Robinson.

The British Armored Force Operations.

FURTHER ASPECTS OF MECHANIZATION. Rowan-Robinson.

SAMOCHODY PANCERNE. Zyrkiewicz.

A well illustrated Polish book on armored cars and wheel-cum-track tanks.

THE FUTURE OF THE BRITISH ARMY. Dening.

Another advocate of extreme mechanization.

TANK AND ARMORED CAR TRAINING.

The official British manual.

TASCHENBUCH DER TANKS. Heigl.

Two volumes. The finest book yet produced. The many photos and drawings illustrate almost every known tank. In German.

LIST OF PERIODICALS

ARMY, NAVY, AND AIR FORCE GAZETTE (British).

ARMY ORDNANCE (American).

BULLETIN DES SCIENCES MILITAIRES BELGE (Belgian).

CAVALRY JOURNAL (American).

INFANTRY JOURNAL (American).

THE FIGHTING FORCES (British).

LA REVUE D' INFANTERIE (French).

MILITAR WOCHENBLATT (German).

MILITAR WISSENSCHAFT U. TECHNISCHE MITTEILUNGEN (Austrian).

ROYAL TANK CORPS JOURNAL (British).

JOURNAL OF THE ROYAL ARTILLERY (British).

TANK NOTES (published by the Library, American Tank School).

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FURTHER ASPECTS OF MECHANIZATION, by Brig. Gen. H. Rowan-Robinson, C. M. G., D. S. O., P. A. C.

The distinguished author of "Further Aspects of Mechanization" has, in this new book, revised and elaborated many of the thoughts presented in his "Artillery; Today and Tomorrow" and "Some Aspects of Mechanization." Concerning these books, which appeared in 1927, the author says that he had, at that time, "never been in personal contact with the armored force, and he had therefore to draw largely on his imagination—." Perusal of the two previous books, particularly the one on artillery, reveals the imaginative quality of this author's work, and though imagination is essential to progress in mechanization, a modicum of control is desirable. Since 1927, the author has "had the opportunity previously denied him of studying the subject of mechanization at close quarters," while acting as chief umpire for the 3d Division, of which the Experimental Armored Force formed part in the British maneuvers of 1928. The results of his observations, further study, and thought on the subject, appear in his new book. He naturally considers mechanization from the viewpoint of British imperial interests and commitments under the Locarno Pacts. Strategic considerations that affect British and American

mechanization plans undoubtedly differ; however, appreciation of the British problems may help us to clarify our own, and study of their tactical ideas may be helpful.

"Further Aspects of Mechanization" discusses the author's present views on both general and specific phases of mechanization problems. Four of the twelve chapters are revised editions of articles that originally appeared in the British *Army, Navy, and Air Force Gazette*.[1] These four chapters deal with the work of the Experimental Armored Force in 1928, future policy, strategy, and tactics. The first chapter that presents new material is called "The Passing of Great Armies." This title indicates its trend, and the following passage makes clear the author's conclusions:—"There will, indeed, always be a large place for cavalry and infantry in the scheme of things in the British Empire, but it will be a special place, in special terrain and against special opponents, and neither of these arms will play any great part in the modern type of European warfare." The remaining chapters discuss specific mechanization problems of infantry, artillery, cavalry, engineers, supply agencies, and air forces. Referring to cooperation between mechanized forces in the air and on the ground, the author asks a question that has received some consideration in our own service:—"Working together in such an intimate relationship, interdependent in so many ways, is it venturesome to suggest that these two services be made one?"

This book is interesting because it shows that personal experience with mechanized units, even through superficial contacts, has served to modify the author's previous views. Mobility has risen in his scale of values, and fire power has somewhat decreased. As yet, the author apparently has not begun to appreciate the value of shock action. His ideas on design, organization, and tactics consequently lack a fundamental element that is essential to a well-balanced presentation of the subject. Despite this fault, the book has value. It raises questions that deserve discussion, and stimulates timely thought on an important subject.

[1] Reprinted in the INFANTRY JOURNAL for August, 1929, page 133, by permission of the Editor, the *Army, Navy, and Air Force Gazette*.

A Peaceful Occupation

From the Notebook of "General Experience"

THE 15th Infantry has been stationed at Tientsin for more than fifteen years and during that entire period has never fired a shot except in target practice.

This speaks well for the tactful administration of the various commanding officers of this regiment.

The Infantry Association

Call for Nominations for the Bi-Annual Election

AN election of officers and members of the executive council will be held in the usual manner the latter part of November. The Secretary has sent a call for nominations to the branch associations. The present announcement is a call to officers at whose station there is no branch association.

Nominations for President, Vice-President and seven members of the council should reach the Secretary by September 15.[1]

Along with this announcement the secretary desires to urge non-members or members who are in arrears to join the Association or to send in their dues for the current year. The Association especially needs financial and moral support just now when it is doing everything it possibly can to help bring about an increase of pay for the Army.

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[1] List of Association Members who will probably be in Washington for two years.

Col. C. C. Allen
2d Lt. T. H. Allen
Capt. P. G. Balcar
Maj. G. P. Baldwin
Maj. L. J. I. Barrett
Maj. J. C. P. Bartholf
Lt. Col. J. R. Brewer
Maj. S A. Brown
Maj. S. B. Buckner, Jr.
Col. F. W. Bugbee
Col. R. J. Burt
Lt. Col. E. Butcher
Capt. G. B. Campbell
[2]Maj. T. B. Catron
Lt. Col. A. D. Chaffin
Capt. W. J. Clear
Maj. R. C. Cotton
Col. E. Croft
Maj. E. P. Denson
[3]Col. John L. DeWitt
Maj. D. D. Eisenhower
Lt. Col. C. B. Elliott
Maj. E. W. Fales
Maj. E. L. Field
Capt. N. D. Franklin
Lt Col. W. S. Fulton
Maj. Gen. S. O. Fuqua
[3]Col. L. D. Gasser
Capt. R. B. Gayle
[3]Lt. Col. H. S. Grier
Maj. W. H. Haislip
Capt. F. B. Hayne
Maj. L. S. Hobbs
Maj. W. H. Hobson
Lt. Col. C. B. Hodges
Col. C. F. Humphrey, Jr.
1st Lt. H. J. Hunt, Jr.
Maj. A. S. Kuegle
Col. M. S. Jarvis
Maj. J. W. Lang
Capt. W. G. Layman
Maj. B. R. Legge
Capt. P. E. Leiber
Capt. A. Lopez
Maj. W. J. McCaughey
Maj. T. F. McNeill
Maj. Bruce Magruder
Maj. F. C. Mahin
Col. C. H. Miller
Maj. M. C. Mitchell
Lt. Col. C. B. Moore
Lt. Col. E. J. Moran
Maj. J. D. Patch
Lt. Col. S. L. Pike
Col. J. F. Preston
Maj. P. L. Ranson
Maj. E. F. Rice
Lt. Col. C. L. Sampson
Capt. R. A. Schow
[4]Brig. Gen. G. S. Simonds
Maj. W. H. Simpson
Lt. Col. M. E. Spalding
Col. D. L. Stone
Col. W. W. Taylor, Jr.
Maj. H. Terrell, Jr.
Capt. H. A. Tonnesen
Col. L. J. VanSchaick
1st Lt. J. C. White
Lt. Col. C. H. Wright
Capt. D. P. Yeuell

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[2] Secretary and Treasurer of the Association and Editor of the INFANTRY JOURNAL at present.

[3] Members of the Executive Council at present.

[4] President of the Association at present.